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THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

Vol. XXXIII. No. 825.] LONDON, MARCH 4, 1879. [31st Year.] Price 6d.

GAS PURIFICATION
BY
OXIDE OF IRON.

COOKE BROS.,
CENTRAL DEPÔTS:
CO. DONEGAL, IRELAND;
LONDON DEPÔT:
BLACKWALL, E.;
OFFICES:
26, 27, & 28, FENCHURCH ST.,
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GENUINE TORBAY PAINT
And SPECIAL GASOMETER PAINT.
Several Prize Medals. Established over 20 Years.
These Paints are now used in over 200 Country Gas-Works, and by all the London Gas Companies, on Gas-holders, Scrubbers, Purifiers, &c. Also used by the Admiralty, War Office, Railway Companies, Founders, &c. They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations; do not crack, blister, or flake off; will cover tar effectually.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.
Supplied, mixed ready for use, or in paste, as desired.
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Works: BRIXHAM, TORBAY.

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BROOKFIELD GAS APPARATUS WORKS,
103, ICKNIELD STREET EAST, BIRMINGHAM.
CONTRACTOR FOR
LAYING MAINS
FOR
Gas, Water, & Sanitary Purposes,
AND MANUFACTURER OF
WOOD GRIDS
FOR
SCRUBBERS AND PURIFIERS.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a Prize Medal was awarded at the Great Exhibition of 1851, for "Gas-Retorts and other Objects in Fire-Clay," and they were also awarded at the International Exhibition of 1862, the Prize Medal for "Gas-Retorts, Fire-Bricks, &c., for Excellence of Quality."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Jos. Cowen & Co. are the only Manufacturers of Fire-Bricks and Clay Retorts at Blaydon Burn.

JOHN RUSSELL & CO.,
LIMITED,
Established at the commencement of Gas Lighting,
Manufacturers of
TUBES AND FITTINGS.
THREE PRIZE MEDALS,
Paris, 1878.
Head London Office:
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ALMA TUBE-WORKS, WALSALL;
OLD PATENT TUBE-WORKS, WEDNESBURY.

JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM,
Manufacturers of
WET AND DRY GAS-METERS,
Licensees and Manufacturers of
HUNTS
PATENT COMPENSATING METERS,
STREET-LAMPS, &c., &c.
Established 1830.

THOMAS PIGGOTT & CO.,
SPRING HILL, BIRMINGHAM,
Manufacturers of
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
Sugar, Saltpetre, and all kinds of Pans.
Roofs, Girders, and Bridges, and General Smith's Work.
London Offices: 97, CANNON STREET—
JAMES E. & SAMUEL SPENCER, Agents.

THE
"OTTO" GAS-ENGINE.
See Page 302.

CROSSLEY BROTHERS,
MANCHESTER AND LONDON.

THE
NITSHILL COMPANY'S
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
AGENT:
JAMES M'KELVIE,
HAYMARKET,
EDINBURGH.

GEORGE GLOVER AND CO.,
HAVE REMOVED TO MORE EXTENSIVE PREMISES,
RANELAGH WORKS, ROYAL AVENUE, CHELSEA, LONDON, S.W.

The want of gaslight, caused by the freezing of Wet Meters, is a very general source of complaint, and it is acknowledged that all attempts to remedy the evil have proved futile.

The want of gaslight during the dark, foggy weather of mid-winter, when gas is most needful, is a source of great loss both to Gas Companies and the public. The convenience and economy of gaslight is so great, compared with any other artificial light; that there is no valid ground for believing that it can be supplanted, and, until coal becomes many times dearer than at present, it must remain the cheapest and most convenient source of light and heat. It is especially to be regretted, when Gas Companies are making every exertion to remove all just grounds of complaint, and, as far as possible, to consult the public convenience, that the annoyance caused by smoky and unsteady flames, or the total extinction of the lights, consequent on the freezing of wet meters, should induce the public to lend a ready ear to the fallacy of the electric light as a substitute for gas.

The destructive influence of the expansive force of water while freezing is familiarly known in the bursting of water-pipes during frost; but the injury to Wet Gas-Meters, although quite as real, being internal, is not so apparent. The internal parts of Meters which have been frozen are warped or ruptured, and they frequently receive further injury by the hasty and unskilful method of thawing them, which often melts the solder as well as the ice, unfastening the bearings or other parts of the Meter, thus admitting of gas passing unregistered. Meters, once frozen, should be thoroughly repaired, and, as soon as convenient, replaced by **properly made Dry Meters** which register correctly, and with the action of which the most intense frost does not interfere.

Of course water in Dry Meters or watches will freeze, but its accidental presence in either is very rare, and there is no excuse for its being in them. More than one parent has been startled by finding his little hopeful experimenting with his watch in the wash-hand basin, and more than one stupid person has been found pouring water into a Dry Meter. Water may also get into Dry Meters by placing them below the level of the main, and connecting the service pipe at the lower part of the main, allowing water to flow into the Meter. Another means of getting water into Dry Meters is by foolishly placing them in connection with Wet Meters, the vapour from which condenses in the Dry Meters. Some water may also find its way into Dry Meters when they have been put in the place of Wet Meters, before clearing the internal pipes and fittings from water that had been deposited in them by evaporation from the Wet Meters.

The presence of water in Dry Meters is so rare and exceptional that it is properly ignored. Water is a necessity in the Wet Meter; but is incompatible with the Dry Meter. No Gas Company or Consumer suffers loss or inconvenience from frozen water in Dry Meters; but it cannot be ignored that many Companies and thousands of Consumers have suffered, and are suffering, serious loss and inconvenience from the freezing of Wet Meters, and some few Companies are suffering from the use of so-called Self-Regulating Meters, through which all the gas can be got unregistered, by inclining the Meter forward either accidentally or with the intention to defraud—a subject deserving the serious attention of such Companies.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

AND

COOMBS WOOD TUBE-WORKS, HALESOWEN,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS,

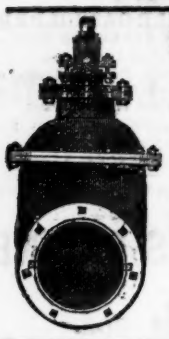
AND

LAP-WELDED IRON AND HOMOGENEOUS METAL BOILER TUBES,

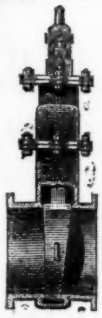
UP TO FOUR FEET IN DIAMETER.

London Offices: No. 4, Cloak Lane, Queen Street, E.C.

Warehouses: London, Liverpool, Manchester, and Lille.



C. & W. WALKERS' DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves have taken the place of the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

MIDLAND IRON-WORKS,

DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

EDWARD E. CROMBIE & CO.,

INVENTORS AND PATENTEES

OF THE

FRICTIONLESS DRY GAS-METERS,

Beg to intimate to Gas Companies and others that they are now prepared to supply these very superior Meters at the same prices as for the ordinary Gas-Meters.

In the construction of this Meter, for which the best tin plates only are used, every mechanical contrivance has been taken advantage of successfully to reduce the friction to a minimum, which is amply proved by the fact that they are made to work upon only one-fortieth of an inch pressure. By an improvement also in their construction, a steadier light is obtained, and greater capacity than can be got from any other Meter in the market. No gas can pass under the valves on any back pressure, as is the case with many other Dry Meters.

To Gas Companies supplying gas through streets with heavy gradients, these Meters are invaluable, as much gas is saved from the low pressure required to work them.

ALL METERS ARE UPHELD FOR FIVE YEARS.

METROPOLITAN WORKS, DIANA PLACE, EUSTON ROAD, LONDON, N.W.

ROBT. DEMPSTER & SONS,

GAS ENGINEERS, IRONFOUNDERS, AND CONTRACTORS,

ROSE MOUNT IRON-WORKS, ELLAND, YORKSHIRE.

MANUFACTURERS OF EVERY DESCRIPTION OF

GAS APPARATUS;

CONTRACTORS FOR THE

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Plans and Specifications Prepared, and Illustrated Catalogues forwarded on application.

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THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

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WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

LONDON OFFICES: 97, CANNON STREET—JAMES E. & SAMUEL SPENCER, AGENTS.

HYDRATED PURIFYING MATERIAL.

Samples on application.

MESSRS. SPENCE BROS., LIMITED,

Will be glad to supply the above on the most favourable terms, and to treat, by Purchase or Exchange, for Spent Oxide.

PRICES ON APPLICATION.

ALSO PATENT DRY COPPERAS FOR EXTRACTING AMMONIA.

VICTORIA CHEMICAL WORKS, BRADFORD, NEAR MANCHESTER.

ALDER AND MACKAY,

MANUFACTURERS OF

IMPROVED WET AND DRY GAS-METERS

IN CAST-IRON AND TIN CASES OF THE HIGHEST EXCELLENCE.

Original Manufacturers of Dry Meters in Cast-Iron Cases.

STATION-METERS, EXPERIMENTAL-METERS, PHOTOMETERS, & PRESSURE-GAUGES, &c.

GRANGE WORKS, EDINBURGH.

GOLDSMITH'S PATENT SIGHT WATER-LINE INDICATING GAS-METER

MANUFACTURED BY GUEST AND CHRIMES,

FOUNDRY AND GENERAL BRASS WORKS, ROTHERHAM;

AND 85, SOUTHWARK ST., LONDON, S.E.

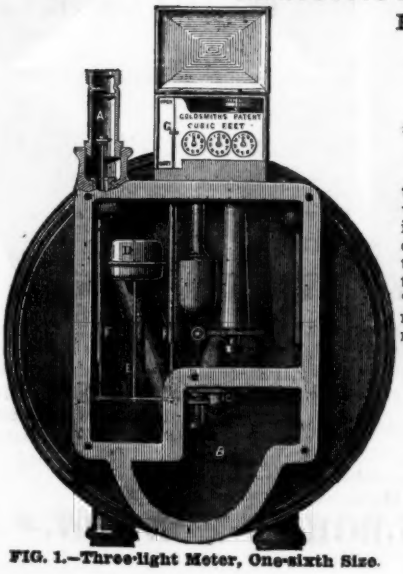


FIG. 1.—Three-light Meter, One-sixth Size.

Fig. 1 is a Meter with front removed to show the arrangement and connection of the Indicator and Valve.

Fig. 2 is front view of Index, with cover up.

The principal object of this invention is to render the water-line in the reservoir at all times visible. It will be seen, by reference to the illustrations, that this is accomplished in the following manner:—On the dial are the words "Open" and "Shut," and attached to the float is the pointer G, which rises and falls with the water-line in the reservoir. If the pointer is at "Open," it shows that the valve is open, and that the reservoir is full. If it is at "Shut," it shows that the reservoir is empty, and that the gas will be shut off.

The following ADVANTAGES will be obvious:—

1. The Inspector can see at a glance if the Meter requires water.
2. No more water than is required need be added, and therefore no water has to run out.
3. The Meter Inspector will be spared a great deal of his most objectionable work, and he will save a great deal of time and trouble.
4. The consumer will not always have to be asked for water, nor will he have to endure the unpleasant smell caused by waste water being run out.

FIG. 2.—Three-light Index, Half Size

GAS PURIFICATION

BY

OXIDE OF IRON.

GAS PURIFICATION & CHEMICAL Co., LIMITED,

PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.

JOHN WM. O'NEILL, Managing Director.

GAS COAL. GAS COAL. GAS COAL.

WELLS, BIRCH, RYDE, and CO., Limited,

HOYLAND SILKSTONE COLLIERIES,

Near BARNSLEY.

This Company is now in a position to raise **2000 tons per day of REAL OLD SILKSTONE GAS COAL.**

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

Prices quoted to any Railway Station, or F.O.B. Hull, Grimsby, Goole, Keadby, Liverpool, and Fleetwood.

Full particulars will be sent on application to above address.

SULPHATE AMMONIA.

R. W. WALLACE & CO.,

60, MARK LANE, LONDON, E.C.,

Are Buyers of SULPHATE AMMONIA in Large or Small Quantities, or Sell on Commission for Gas Companies and Makers.

PLANT ERECTED ON THE LATEST AND MOST APPROVED PRINCIPLE.

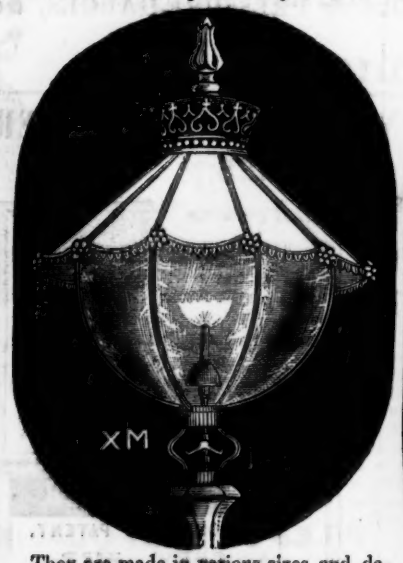
AGENTS to THE GASLIGHT AND COKE COMPANY, LONDON, for the SALE of SULPHATE AMMONIA. Works: BECKTON.

IMPROVED REFLECTING STREET-LAMPS.

D. HULETT having had numerous inquiries for an **Improved Street-Lamp,** begs to call the attention of **Gas and Railway Companies, Local Authorities, and others** to his **Improved Reflecting Lamps,** which are constructed to give the greatest amount of light from the quantity of gas consumed.

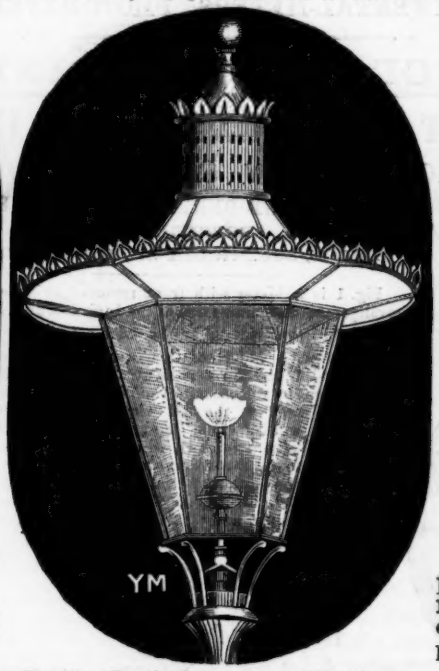
They are strongly recommended for **Railway Platforms and large open spaces,** or any places requiring a good light at a comparative small cost for gas.

The 14-inch square Lamp is made to fit the ordinary Lamp-Cradle now in use, and is fitted with a 24-inch Reflector.



They are made in various sizes and designs—circular, hexagonal, or square.

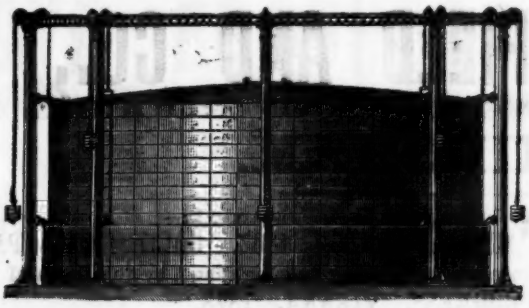
Where Argand burners are preferred, these Lamps are constructed with effectual Wind-Guards.



Special attention is called to our **Duplex Gas Burner with Mercurial Governor.** By this arrangement a considerable increase in the illuminating power of the gas consumed is obtained.

Further Particulars upon application to

D. HULETT, 55 and 56, HIGH HOLBORN, LONDON.



J. T. B. PORTER & CO.,

GAS ENGINEERS & MANUFACTURERS,

IRONFOUNDERS AND CONTRACTORS,

GOWTS BRIDGE WORKS,

LINCOLN.

LONDON OFFICES: 1, WESTMINSTER CHAMBERS, S.W.

ESTIMATES FOR GAS-WORKS OF ANY SIZE.

REFERENCES TO 500 WORKS ALREADY ERECTED.

N.B.—All Communications to be addressed to the FIRM ONLY.

J. & J. BRADDOCK,

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GLOBE METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET & DRY CONSUMERS GAS-METERS,

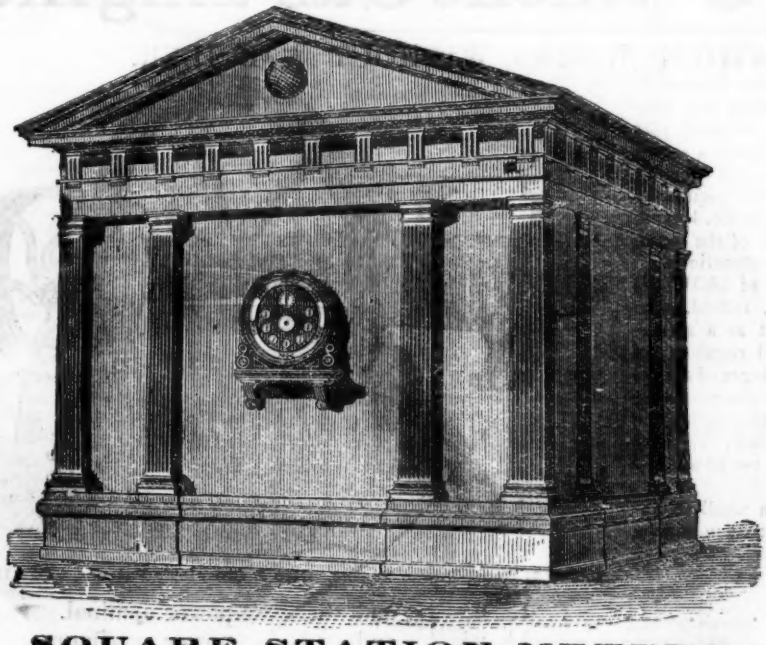
OF THE HIGHEST EXCELLENCE ONLY;

ALSO LICENSEES AND MANUFACTURERS OF

WARNER & COWAN'S PATENT SELF-REGULATING GAS-METERS;

ROUND STATION-METERS,

ON CAST-IRON STANDS.



SQUARE STATION-METERS,

WITH PLANED JOINTS.

GOVERNORS, GAUGES, INDICATORS, MAIN COCKS, &c.

GAS COOKING APPARATUS.

Home and Foreign Orders promptly attended to.

All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.

Orders almost invariably despatched on the day of receipt.

TERMS, &c. ON APPLICATION.

C. & W. WALKER'S

WOOD PURIFIER SIEVES,

Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS,
DONNINGTON, NEAR NEWPORT, SHROPSHIRE.
FINSBURY CIRCUS, LONDON.

ESTABLISHED IN 1850.

BENJAMIN CARPENTER,

THE ORIGINAL MANUFACTURER OF THE IMPROVED

WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

PROVIDENCE WORKS,
22, HERMES STREET, PENTONVILLE ROAD,
LONDON, N.

MOBBERLEY & PERRY,

FIRE CLAY and BRICK WORKS,

STOURBRIDGE.

Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAY.
Manufacturers for Home and Export.
GAS-RETORTS, GLASS-HOUSE FURNACE,
BLAST-FURNACE, TANK BRICKS, LUMPS, TILES,
And Every Description of Best Fire-Bricks.

JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER

AND

CANNEL COAL FACTOR,

30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTER-MIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

GRIRDROD'S PATENT

PORTABLE PIPE SCREWING

MACHINE,

For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.

In use at the chief gas-works, and giving great satisfaction.

For other useful goods, see Bailey's "Illustrated Inventions," post free 3s. 6d.; gratis to ledger customers.

W. H. BAILEY & CO.,

Brassfounders, Gauge Injector and Tool Makers,

ALBION WORKS, SALFORD,

LANCASHIRE.

Gold Medal Awarded, Paris Exhibition, 1878.

THOMAS TURTON AND SONS,

SHEAF AND SPRING WORKS,

SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY

FOR ENGINEERS,

STEEL OF ALL DESCRIPTIONS,

SCREW STOCKS, TAPS, AND DIES, SPANNERS
RATCHET BRACES, LIFTING-JACKS,
ANVILS, VICES,
AND ENGINEERS TOOLS GENERALLY.

LONDON OFFICE:

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R. W. WINFIELD AND CO.,

CAMBRIDGE STREET WORKS AND ROLLING MILLS,

BIRMINGHAM.

The following Medals have been awarded:—

GRAND COUNCIL MEDAL, LONDON, 1851. MEDAL, LONDON, 1862. GOLD MEDAL, PARIS, 1867,

The only Gold Medal awarded for "Apparatus and Processes for Heating and Lighting" by the Imperial Commissioners.

MEDAL FOR PROGRESS, VIENNA, 1873.

The following Medals were also awarded at Paris, 1878:—

GOLD MEDAL for Chandeliers and Gas-Fittings.

GOLD MEDAL (Rappel) for Metallic Bedsteads and Furniture.

GOLD MEDAL (Rappel) for Art Metal Work. BRONZE MEDAL for Tube Metal and Wire.

MANUFACTURERS OF BRASS AND COPPER SHEETS,

TUBE AND WIRE,

ROLLED METALS, LOCOMOTIVE AND CONDENSER TUBES, CYLINDERS;

Ornamental, Taper, and Cased Tubes; Tin Tubes;

GAS-FITTINGS, CHANDELIERS,

BRACKETS FOR HEATING AND LIGHTING;

METALLIC BEDSTEADS.

Ecclesiastical and Mediæval Metal Workers.

GENERAL BRASSFOUNDERS.

REGISTERED TRADE MARK:

R. W. W. & CO.

LONDON OFFICES & SHOW-ROOMS: 141, FLEET STREET, E.C.

THE

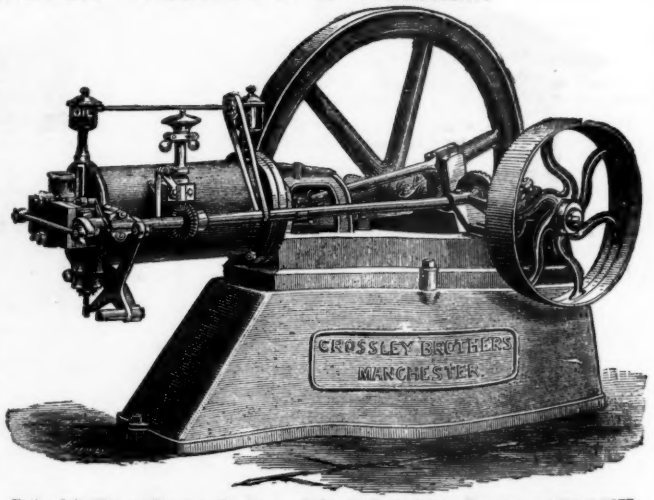
New "OTTO" Silent Gas-Engine.

AN ENGINE WHICH WORKS WITHOUT A BOILER.

The principle of combustion in this Gas-Engine is ENTIRELY NEW. In it an explosion does not take place in the ordinary meaning of the term. A small part only of the charge is combustible, which on ignition serves to expand the remainder, thus avoiding shock and effecting great economy. The Engine is also alone in the peculiarity of igniting its charge at the *beginning* of the stroke, leaving the whole of the stroke for effecting expansion of the gases, instead of merely a fraction as in obsolete constructions.

This Engine has a SMALLER NUMBER of MOVING PARTS than any other Gas-Engine; or, indeed, than many steam-engines. It is almost as silent as a steam-engine, works with the same smoothness and regularity of speed, and has the immense additional advantages of always being ready to start at full power at once on the gas being lighted; and, by dispensing with the boiler, of avoiding the danger of explosion, increased rates for insurance, expensive attendance, and all the annoyance which the use of a boiler entails.

Where work is intermittent, trouble with a small steam-engine and boiler is at its maximum, but at its minimum with a Gas-Engine.



Cut of 3½ Horse-Power Engine. Otto & Crossley's Patents, 1876 & 1877.

Sizes at present offered . . . . 1, 2, 3½, and 8 Horse-power nominal.
Being equal to about . . . . 1½, 2½, 4, and 12 Horse-power maximum.
Cost of Gas, One Penny per hour per indicated Horse-power, at 4s. per 1000 cubic feet.

PRICES, LIST OF USERS, AND BOOK OF SEVENTY TESTIMONIALS, ETC., ON APPLICATION TO

CROSSLEY BROTHERS,

WORKS: GREAT MARLBOROUGH STREET, MANCHESTER.

LONDON WAREHOUSE: 116, QUEEN VICTORIA STREET, E.C.

SOLE ENGLISH AND COLONIAL MAKERS.

TANGYE BROTHERS AND HOLMAN,

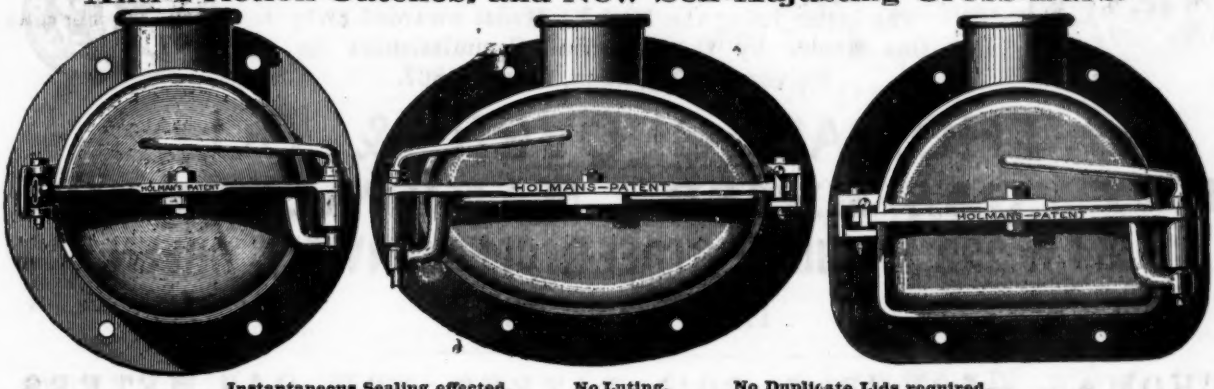
CORNWALL HOUSE, 35, QUEEN VICTORIA STREET, LONDON, E.C.,

(LATE OF 10, LAURENCE POUNTNEY LANE.)

SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,

Anti-Friction Catches, and New Self-Adjusting Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.
Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested, being now in use in nearly all the principal Gas-Works in London and the Provinces.

T. B. and H. are now making the "Morton's Self-Sealing Lid" of the SAME FORM OR SECTION AS THE RETORT (see Illustrations above), as well as bringing the Mouthpiece from the D or Oval at back to Circular in front, as heretofore.

D and Oval Morton's Lids are working satisfactorily both in this country, on the Continent, and in the United States of America. Among others they have been adopted by the following Gas-Works:—

The Gaslight Company's Works, Fulham; Ditto, Bromley-by-Bow; Ditto, King's Cross; Ditto, Shoreditch.
And also in the Gas-Works at Richmond, Maidstone, Gloucester, Glasgow, Portsea, Roubaix (France), The Hague (Holland

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at an convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

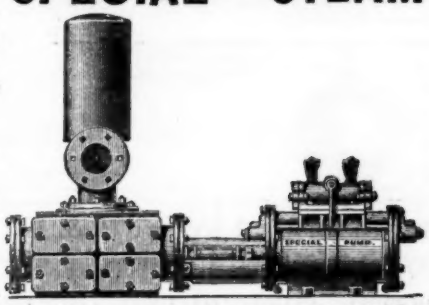
Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,
(Signed) JOHN JOHNSON.

PRICES AND FULL PARTICULARS ON APPLICATION.

THE "SPECIAL" STEAM-PUMP.

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	450	£16
4	2	9	815	18
5*	2½	12	1,250*	20
5*	3	12	1,830*	22 10
4	4	12	3,250	25
6*	4	12	3,250*	30
5	5	12	5,070	32 10
7*	5	12	5,070*	40
6	6	12	7,330	40
8*	6	12	7,330*	50
7	7	12	9,750	50
10*	7	12	9,750*	65



In use in a Hundred Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

Messrs. Burt, Boulton, and Haywood, Manufacturing Chemists, have over FORTY "Special" Steam-Pumps in use at their several large Tar-Works.

Two Hundred Sizes made. Those in Table opposite are the leading Sizes for use in Gas-Works and Chemical Works.

*** These Sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance-piece between steam and pump cylinder, at a small extra cost.**

TANGYE'S HIGH-PRESSURE AND CONDENSING STEAM-ENGINES; CORNISH, VERTICAL, & TUBULAR BOILERS; HYDRAULIC AND SCREW LIFTING-JACKS, CRABS, PULLEY-BLOCKS, &c.

FULL PARTICULARS, ESTIMATES, CATALOGUES, ETC., ON APPLICATION.

London, 1851 New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS.

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.

(ESTABLISHED 1816)

ARE THE ONLY MAKERS

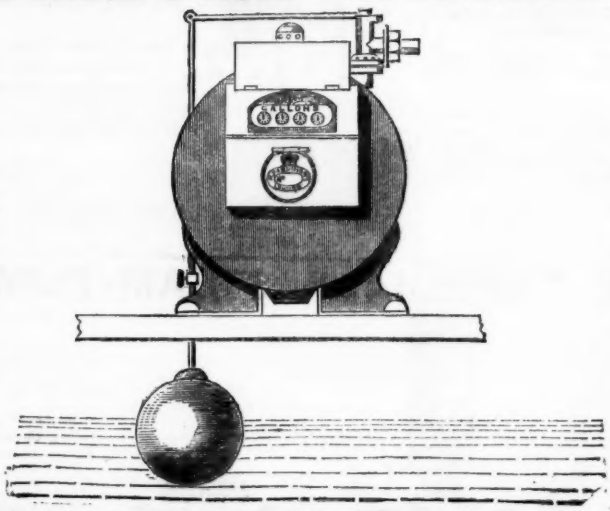
OF THE

LOW-PRESSURE WATER-METER.

These Meters will register with perfect accuracy, either at full speed, or with a few drops only passing through them.

They must be placed over the cistern to be supplied, and the water, after being measured, will fall from the outlet into the cistern below. Each Meter is fitted with a ball-valve, so made that it can be adjusted to shut off the supply at the inlet when the water reaches any required height in the cistern.

The 100-gallon Meter is fitted with a cistern holding about three or four gallons, and may be fixed inside a house, free from the effects of frost, and requires no attention after once being fixed.



From "The Engineer," April 6, 1877.

"Low-pressure Meters have been found to register with almost perfect accuracy, or, at all events, within 5 per cent. either for or against the consumer, and from the nature of their construction are by no means easily deranged. Still, even the low-pressure meters have their disadvantages, but these are chiefly as respects the question of first cost, seeing that they must have a cistern fixed at a higher level than that at which the supply is needed. All things considered, however, the balance of opinion rules at present in favour of the low-pressure Meter, and they are consequently increasing in favour as time goes on."

These Meters have been manufactured by W. P. & Co for more than 25 years, and are largely used by the following and other Water Companies:—

NOTTINGHAM, DERBY, LEICESTER, SUNDERLAND, GREAT YARMOUTH, SHEFFIELD, NORWICH, LOWESTOFT, COVENTRY, SOUTHEND.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MARCH 4, 1879.

Circular to Gas Companies.

An attempt was made, at a special meeting of the Metropolitan Board of Works last Friday, to persuade them to rescind a resolution they passed some time ago, to the effect that they would not oppose that section of the Bill now being promoted by the Chartered Company which gives a magistrate discretionary power in deciding as to the amount of the forfeiture to be paid by the Company for deficiency in illuminating power. However, those members of the Board who always oppose Gas Companies, did not muster in sufficient numbers, and the resolution was confirmed. We have nothing to complain of in the discussion. The tone was good, and the language used by no means violent. Mr. Runtz opposed the resolution to rescind, and showed that the Board had nothing to gain by the words "not exceeding" being left out of the clause. Several other speakers took the same view, and Mr. Robert Jones clenched his argument by pointing out that, when the Board themselves were promoting a Gas Bill, they never proposed such a penal clause as many members now desire to fasten on the Chartered Company.

The Gas Referees have made a communication to the Board of Trade respecting the arrangements for gas-testing in the Metropolis. The letter having been submitted to the Metropolitan Board of Works for their opinion, a reply has been sent, stating that they consider the gas should be tested in the districts in which it is consumed, and that the Beckton testing-station should be abolished as unnecessary. It would, we fancy, be difficult to-day, in the Chartered Company's limits, to say that the gas is always tested in the district in which it is consumed. Nor do we see why it should be. We know perfectly well that the loss of illuminating power in well-purified gas is very small indeed after travelling a long distance. We know of no reason, then, why the *locale* of the stations should be changed, unless the spot be found unsuitable for making pressure tests. Without the full text of the correspondence, which we have not before us, it is difficult to say what object the Referees are aiming at; but, from their well-known impartiality, we may be certain that the just interests of the Gas Companies will be fairly considered in all the changes they may propose.

The annual meeting of the South Shields Gas Company was held on the 27th ult., when dividends at the rate of four and a half and three and a half per cent., for the half year, were declared. The Chairman, in his address, expressed a hope that the opposition threatened to the Bill now before Parliament would be withdrawn. He reckons, perhaps, without his host; but there is really little in the Bill that the Corporation could possibly object to, and certainly the money of the ratepayers ought not to be wasted in frivolous and vexatious opposition.

The accounts of the Peterborough Gas Company have been issued, and show that the undertaking is as prosperous as ever. They pay, as usual, full dividends, and back dividends to the amount of two per cent. on the ordinary, and one per cent. on the new ordinary shares, for the year ending Sept. 30, 1871, free of income-tax. After the payment of dividends and arrears, the Company are able to carry forward £258. The report informs us that the Directors have commenced the manufacture of sulphate of ammonia with very successful results, even in these hard times. We are glad to learn that a reduction in price is likely soon to be made in Peterborough.

The nineteenth annual meeting of the Redhill Gas Company was held on the 21st ult., when a full dividend of ten per cent. was declared, and one per cent. to make up arrears of dividend before January, 1875. The balance-sheet shows a net profit of £3151, which, after the payment of the dividend and the bonus, will leave a balance of £310 to be carried forward. The consumption of gas rapidly increases in the district supplied by the Company, and favourable contracts have been made with the Authorities for the supply of the public lights. In such prosperous circumstances, the Directors have reduced the price of gas sixpence per thousand feet all round.

The Ipswich Gas Company held their annual meeting on the 17th ult., and, of course, full statutory dividends were declared. The business of this Company also increases rapidly, and the Directors have found it necessary to add to the storeage plant. Complaints of want of gas have been frequently made in Ipswich, and the Chairman seems to think that the erection of another holder will enable the Company to send gas faster into the town. His engineering advisers will probably recommend him to see to the mains, in order to ascertain whether they are of sufficient capacity to carry, at a reasonable pressure, the amount of gas required.

The fifty-fourth half-yearly general meeting of the Wolverhampton Gas Company was held last Tuesday, when full dividends of ten and six per cent. were declared. Notwithstanding the depressed state of trade in Wolverhampton, the consumption of gas has increased so much that the reduction in price made last year has not affected the revenue. The charge for gas in Wolverhampton is now 2s. 6d. per thousand feet, which makes them almost the lowest-priced Company in the kingdom—perhaps the lowest, when the quality of the gas is considered.

A few words more will suffice to complete our notice of the Companies meetings recently held. The Reading Gas Company pay full statutory dividends for the half year, and the Directors have since announced that from the beginning of this year the price of gas has been reduced threepence per thousand feet. Extensions in plant, &c., are required to meet the increased demands.

The Brighton Gaslight and Coke Company also pay full dividends for the half year. The Directors have reduced the price of gas, since last Michaelmas, to the uniform rate of 3s. 6d. per thousand feet in the Preston district. Here again, "notwithstanding the depression in trade," the consumption of gas continues to increase, and the Brighton works will soon have to be enlarged.

We have received the gas accounts of the Blackburn Corporation, for the year ending Dec. 31, 1878, in the usual very clear and simple form. We learn from them that the capital engaged in the gas undertaking amounts to £339,604. The amount realized

by the sale of gas during the past year, for public and private lighting, and the rental of meters, was £55,912. The sale of residual products brought £7998, making, with a few other items, total receipts to the amount of £64,876. Against this has to be set an expenditure of £39,508, which leaves the Corporation with a gross profit of £25,368. About £19,495 of this goes for the payment of annuities, after which the Corporation are left with a net profit of about £5873, part of which is devoted to the reserve-fund, and the remainder is to be carried to next account. The manufacturing details, which our readers will see in another column are given at some length, show excellent results. The average make per ton of coal was 10,844 cubic feet of eighteen-candle gas. The unaccounted-for gas amounted to little more than 9 per cent. on the make. The Corporation seem to have done very well with their residual products, and altogether ought to be well satisfied with the past year's working of the gas undertaking.

The Exeter Town Council have, much against their inclination, withdrawn the whole of their Bill, promoted first to make a purchase of the Gas Company's undertaking, and then to effect sundry improvements in the City. The ratepayers, our readers will remember, refused their sanction to that part of the measure which committed the Council to the purchase of the gas-works; the remainder of the Bill might, perhaps, have been proceeded with successfully, but the Council feared to make another appeal to the ratepayers, so the whole thing has fallen through. We are sorry that some of the sanitary arrangements proposed by the Town Council cannot be carried out without a twelvemonth's delay. Next year possibly the ratepayers may be found in a happier state of mind, and in that case we recommend the Council to leave out the acquisition of the gas-works, and proceed vigorously with the sanitary portion of their Bill.

The Town Council of Plymouth decided last Thursday to affix the Corporation seal to a petition against the Gas Company's Bill. After reading through a long report of the meeting, we fail to discover what the Council find to object to in the Bill, or rather in the preamble. Parts of this latter, they say, are untrue. This charge they will, of course, have to substantiate before a Parliamentary Committee, and, if they fail, their case is gone. We have said before that the Town Council of Plymouth are a very ungrateful body. No town in the United Kingdom has been better served by a Gas Company than Plymouth. The gas supplied has been of very fair quality, considering the price charged, and if the Town Council wish for a higher illuminating power, they must be content to pay at a higher rate. We are not much afraid of the opposition as it looks at present, and cannot help thinking that Parliament will sympathize with the Company rather than with the Corporation.

A meeting, under the Borough Funds Act, 1872, to obtain the sanction of ratepayers and owners to the expenditure of public funds in opposing the Bill of the Newcastle and Gateshead Gas Company, was held recently. When the proceedings commenced, the local reporter tells us that just seven ratepayers had put in an appearance. Perhaps the number gathered strength as the evening wore on; but the Town Council must have been very much depressed on finding that their constituents took so little interest in a matter which they deemed of so much importance. The meeting gave their consent to the opposition, and the proceedings terminated.

An exhibition of gas appliances opened at Bradford yesterday, and the other north country exhibitions, to which we have alluded before, will come off in the course of this and the ensuing month. We cannot help thinking that the manufacturers and exhibitors of apparatus will become somewhat tired of these exhibitions. They have to remember the grand display, under the auspices of the Chartered Company, which will be made at the show of the Royal Agricultural Society, to be held in July next. This display ought to surpass any that has been made in the United Kingdom. Gas Companies are doing all they can to proclaim the advantages of gas for cooking and heating purposes, and among those anxious to push their business in this direction are the Hornsey Gas Company, who have circulated among their customers a pamphlet on the subject. This Company let cooking and heating stoves on hire, on reasonable terms.

In the course of a few days, a grand experiment will be made in public illumination. Messrs. Edmundson and Co., of Dublin and Westminster, with the consent of the Metropolitan Board of Works, and the assistance of the Chartered Gas Company, are about to place on the "refuge" at the west end of the Embankment, and in front of St. Stephen's Club, one of Mr. Wigham's small gas lighthouse burners. It will consist of three concentric rings of jets, the inner ring having the diameter of about two inches, and the outer, we think, about four inches. By the use of a metallic tube, brought down to within about three or four inches of the burner, the separate jets are collected and combined into a mass of flame of dazzling brilliancy. The consumption of gas with such a burner, we have been told, is about 50 feet per hour, and the illuminating power equals four hundred candles. When the light is installed, a further account will be given. We highly commend the efforts being made by Gas Companies and fitters to improve our public lighting; but we fear that all their pains and all their money will be thrown away, as far as they are concerned. So long as a Gas Company will supply any quantity of gas for nothing, and fitters will furnish burners and lanterns on the same terms, all will go well; but when the day comes to say to the Metropolitan Board and the Vestries, "We have shown you what we can do with gas; now, "if you wish the lights to be continued, we will go on, on such "and such terms," the answer will probably be, "We are very "much obliged to you for the exertions made, and we have been "much gratified by your exhibitions; but the old style of light-"ing cost money enough, and we cannot put the ratepayers to "greater expense."

Lieut.-Col. Haywood has issued his report on the works executed by the Commissioners of Sewers of the City of London during 1878. With the bulk of the work done we are scarcely concerned; but we must refer to the account given in the report, of the relations of The Gaslight and Coke Company with the Commissioners. These, we are very glad to learn, are of an amicable character. The contract for public lighting seems to have been settled to the content of the Commissioners. The prices are the same as last year; but the Engineer fairly notices the fact that, since 1874, the price charged for the public lamps has been gradually reduced. The number of defective lights observed during the year has been exceedingly small—only about two per night out of the large number burning within the City limits. The Commissioners have meters attached to 36 public lamps within their limits, and the registers of these show that the quantity of gas contracted for is always given. The Inspector of Lighting has expressed an opinion that the full quantity is supplied to every lamp. To Lieut.-Col. Haywood's observations on the subject of electric lighting we shall not now refer. The City of London, we believe, have now nearly done with the light, and by-and-by we shall have full details of the results of their experience in connection with it.

We publish to-day the thoughtful Address recently delivered by Mr. T. Newbigging, C.E., at the meeting of the Manchester District Institution of Gas Engineers. The beneficial results of social and professional intercourse between men engaged in the same occupation, are now fully recognized; and thus we have springing up, in various parts of the country, Associations to promote the interchange of ideas between Gas Managers. The Manchester Institution is, we believe, the oldest of the Provincial Associations, and it certainly has not been the least successful. With Presidents like Mr. Newbigging, who have taken an active part in all the concerns of the Institution, the meetings have always been pleasant, while the papers and discussions have been of great value. If Mr. Newbigging's suggestions be followed, and communications be made on the topics he has indicated, the future of the Institution will prove still more fruitful in practical results than its past. We have, for the moment, left unnoticed Mr. Newbigging's views on the electric light. They are necessarily those which are shared by every practical Gas Engineer, who has given his attention to the subject of electric lighting. The weak point is hit when we are told that electricity cannot be stored, and without storeage no continuous and regular supply of the fluid can be maintained. It must not at present be said that electricity cannot be stored. Frictional electricity can, indeed, be stored in a Leyden jar; but the worst of it is that, with our present knowledge, it must all be let out at once, and disagreeable consequences, if care be not taken, may result to the operator. The inventor of the future has to discover the means of letting out electricity gently, and in just such quantities and at such times as it is needed. If he should succeed, he may make a Leyden jar as big as a gasholder, and no one need be afraid to go near it. So accomplished an Engineer as the President could not pass over the early education of a Gas Manager. We quite agree with all he says on the matter, and hope to see the day when careful attention will be paid to the education of a young man intended for the profession of a Gas Engineer. That education should be theoretical and practical. The theoretical part can be acquired anywhere; but the practical can only be obtained in the works. Such knowledge must be gained before a Manager can exercise an efficient control over skilled workmen, who soon pick out weak points in their superiors. With this brief notice of the able and valuable Address of Mr. Newbigging, we commend it to the attentive perusal of our readers.

Water and Sanitary Notes.

We do not expect much to come of the movement set on foot by the Vestry of St. Martin's-in-the-Fields, in opposition to the rates charged by the Metropolitan Water Companies. Mr. E. J. Watherston, who took the chair at the Conference held last Thursday, is exactly the man to spoil a good case, if he had one. He asserts that the water supply of London is deficient in quantity and indifferent in quality, and that the charges are extortionate. The average supply of water within the limits of the Metropolis is twenty-five gallons per diem for every head of the population. It is very well known to all who have gone into the question, that at least one-half of this quantity runs to waste. As regards the quality, we leave the doctors and quacks to settle this matter between themselves. We simply point to the healthiness of the Metropolis, and ask, if water has any influence over health, can the quality of the supply be, after all, so bad? It is not astonishing to find that a number of vestrymen should gather together to discuss a question of which they know nothing; they say that the charges of the Water Companies are extortionate; they declaim against the powers granted to Water Companies to charge for supply upon rateable value; but they do not know to what extent the Companies can rate. A resolution was gravely passed at the Conference, recommending every Vestry and District Board to purchase copies of the Acts of the Company who supply their district. When these Acts have been procured, we hope they will be attentively studied by the vestrymen, and further inquiries will be instituted among the consumers, as to the charges made and the water supplied. We know, however, what will happen. The Conference will sit, listen to, and believe every malcontent; but if any one should defend the Companies, he will either be laughed at or abused.

It is not surprising to learn that the waters of the Thames and of the Lea were turbid during a portion of January. Nobody knows what harm turbid water does, but it is not agreeable to look at, although, in all probability, no ordinary consumer has the means of discovering the turbidity. The Water Companies, however, are now pretty well able to cope with the difficulties of the flood seasons, and we have no doubt that the waters reached the consumers in a state which required a two-foot glass tube to discover whatever turbidity was present. Lieut.-Col. Bolton appears to keep a strict watch at the intakes, but what good results from his observations we have yet to learn.

Last Tuesday, Mr. E. S. Howard brought forward his motion for the appointment of a Royal Commission to inquire into the water resources of Lancashire and West Yorkshire, and, as we predicted, the Government could not entertain the proposal. The mover was left almost entirely unsupported, and eventually the motion was withdrawn. On the following day, the second reading of the Bill was taken, and, after a short discussion, it was referred to a hybrid Committee. As the Bill is not precisely the same as that which was before a similar Committee last year, there may be a little scope for fresh investigation, which, however, can hardly be required. It will be remembered that, last year, the Corporation of Manchester amended their Bill in accordance with the suggestions of the Committee, and that Earl Redesdale rejected the Bill, mainly because the suggestions of the Commons Committee had been adopted, and the Standing Orders, in consequence, not entirely complied with. This year the Bill will go before the Houses a little altered—amended, we think—and with Standing Orders perfectly satisfied, and we have little doubt that the present Committee will pass the preamble after a short hearing.

When Mr. Wheelhouse points out gathering-grounds in Derbyshire, which the Corporation of Manchester might appropriate, he forgets to mention that there are other towns nearer, which, in all probability, will, in the course of a few years, be in want of water, and that it would be unjust of Manchester to forestall them in taking a supply from grounds which belong naturally to another community. All this, however, has been well studied by the Water Committee of the Town Council of Manchester, who have considered the matter in all its bearings. They do not go to Parliament to waste three or four millions of their constituents money, but simply to do their duty in furnishing the most ample supply of water they can.

It is too late now to talk about the sacredness of the Lakes. A scheme is being revived, of which, in all probability, we shall presently hear more, to empower Newcastle to tap Ulleswater; Manchester will, it is to be hoped, secure power to appropriate Thirlmere; Liverpool, we are sorry to say, seems to have abandoned the proposal to take a supply of water from Windermere; Crummock Water has been appropriated for the supply of Cockermouth Whitehaven attempted, but failed to obtain power to take water from Ennerdale Lake; but as the demand for water increases, the supply for our teeming populations will necessarily absorb the northern lakes, the great reservoirs of water for the centre of England.

The Derby Water-Works Company held their half-yearly meeting last Thursday, and having taken a small sum from the reserve-fund, are able to pay a dividend of six per cent. The Chairman very briefly alluded to the purchase of the undertaking by the Corporation of Derby, a question which, it seems, is to be brought before the Shareholders of the Company in about ten days time.

The city of Ely is at present supplied with water from the River Ouse. From a report by Mr. H. Tomlison, C.E., of Cambridge, we gather that the water distributed is not of a satisfactory character. He therefore proposes an alternative scheme, which is to sink a well in the chalk, and so change altogether the source of supply. It is sometimes dangerous to make a sudden change from one source to another; but, considering the hardness of the Ouse water, we do not expect any bad results to follow the change at Ely to chalk water.

According to rather contradictory reports, the lower greensand has been reached at Caterham, at a depth of 851 feet, and a good supply of water found. Another report states that, at the same depth, sand, which looked as though it were near water, was obtained; but we have no means of reconciling these conflicting statements. The New River Company are also boring at Turnford and Ware, in the hope of reaching the lower greensand; and the Lambeth Water Company are boring at Ditton, to ascertain the depth of the chalk basin in that locality. Certainly, it will not be the fault of the Water Companies, if a more copious supply of water be not soon found for London. The most exacting vestryman might be content with the efforts the Companies are making to satisfy his unreasonable demands.

The Bill promoted by the Metropolitan Board of Works to provide for the prevention of floods within the Metropolitan area, was read a second time last Friday, and referred to a hybrid Committee. There is evidently a strong feeling in the House of Commons, that the House should not be trifled with, and that if the decision of the Committee do not accord with the wishes of the Metropolitan Board, the Bill, as amended by Committee, shall nevertheless be proceeded with. We have repeatedly put before our readers the point on which the Metropolitan Board and the South London Vestries are in opposition. It was clearly stated by Mr. Raikes who said that the main question at issue was whether or not the cost should fall upon the riverside people or the Metropolis generally. We fancy the hybrid Committee will take the latter view.

Death of Mr. P. Le Neve Foster.—We regret to announce that Mr. Peter Le Neve Foster, the well-known Secretary of the Society of Arts, died suddenly on Thursday, the 20th ult. Mr. Foster became Secretary of the Society some 25 years ago, and since that time has been its moving spirit. He was in his 70th year.

East Ardsley Gas Company.—At the half-yearly general meeting of this Company, held on the 20th ult.—Mr. W. Challenger in the chair—a dividend at the rate of 2½ per cent. per annum was declared. In moving the adoption of the report, the Chairman remarked that, taking into consideration the general depression in trade, he thought the report was as satisfactory as the Shareholders could expect. He also announced that several ratepayers had agreed to guarantee £150 towards the cost of extending the mains to West Ardsley, and the Directors had decided so to extend the mains, the result of which was expected to be beneficial to the Company. The report was adopted, and the proceedings closed with a vote of thanks to the Directors.

Grantham Water-Works Company.—The half-yearly meeting of this Company was held on Thursday, the 10th ult. Mr. Ridge presided, and the following report was presented:—"Your Directors have much pleasure in presenting to the Shareholders their statement of accounts for the past half year, which includes all receipts and disbursements for that period. Your Directors are of opinion that the time has arrived when a larger main, from the reservoir on Spittlegate Hill to St. Peter's Hill, is necessary, and therefore contemplate at an early period laying down a 12-inch main, by which means the supply to the manufacturers, maltsters, and to the town generally, will be materially improved." The statement of accounts was presented, and showed the capital account to stand as follows:—Receipts: To amount of paid-up capital, in 3000 shares of £10 each, £30,000; to amount of 500 new shares of £10 each, less amount of calls (£215) to collect, £4785—total, £34,785. Payments: By amount expended, as per statement, June 30, 1878, £33,119 7s.; by amount expended in construction of works, £156 4s.; balance, £1509 9s.—total, £34,785. In the revenue account the total receipts amounted to £4962 18s. 9d., including the water-rental for half year ending Dec. 31, 1878, £1878 19s. 9d. The principal payments were—Dividends, August, 1878, at 9 per cent., £2700; cost of working and repairing engine, £218 19s. 2d.; repairs of service, £58 0s. 1d.; salaries, £139 2s. 8d.; Managing Directors, £50—leaving a balance in favour of the Company of £1657 18s. 3d. The Chairman, in moving the adoption of the report and accounts, remarked that the working of the Company during the previous half year did not call for special notice. Referring to the accounts, he was sorry to say that, compared with the similar period of last year, their receipts had fallen off by £150, owing to the fact that the Great Northern Railway Company's consumption had been less by that amount, consequent upon the diversion and reduction of the traffic. He hoped, however, that this falling off would be made good before long. Mr. B. C. Ogden seconded the motion, which was unanimously agreed to. The retiring Directors and Auditors were re-elected, and a vote of thanks to the Chairman concluded the proceedings.

WATER BILLS FOR 1879.

(*Continued from page* 268.)

The *Glasgow Corporation Water Bill* is to authorize the Commissioners of the Glasgow Corporation Water-Works to construct additional works on the Clyde—most of them temporary, we may take it. The object of the permanent works, as our readers were informed last week, is to supply manufacturers, and so save the drain on Loch Katrine and Gorbals. No additional borrowing powers are asked.

The *Llandudno Improvement Bill* is to authorize the Commissioners to abandon certain works sanctioned by their Act of 1876, and to construct others in lieu thereof. These new works are to be situated in the county of Carnarvon, and the conduits will pass through portions of Denbigh. For the additional works the Commissioners ask power to borrow £20,000.

The *Manchester Corporation Water-Works Bill* is again presented to obtain the sanction of Parliament for the execution of the scheme for bringing a supply of water from Lake Thirlmere to Manchester and the neighbourhood. The Corporation are making every effort to preserve the scenery of the Lake in its primeval beauty, and for this purpose they propose to give the First Commissioner of Works power to put a veto on the execution of any part of the plans which he thinks may interfere with the natural attractiveness of the locality. Nothing could be more complete than the arrangements made by the Corporation for the avoidance of offence to owners of property through whose lands the aqueduct must pass. The labouring classes are no less cared for, as it is provided that the Corporation shall find accommodation for such as are displaced. Liberal provisions are proposed for the supply of water in bulk to any Sanitary Authorities or Local Bodies lying along the line of aqueduct. Our readers have been for the last year or two in possession of a tolerably full knowledge of the details of this, the grandest water scheme ever proposed in this kingdom. We have great hopes that it will pass this year almost unchallenged. It only remains to be said that, in order to carry it into execution, the Corporation of Manchester seek power to borrow £3,425,000.

The *Nelson Local Board Bill* is, among other things, to authorize the Board to extend their water-works. They seek power to borrow for this purpose £18,000. The new works are of purely local interest, but it seems that the Walverden works are to be specially protected.

The *Nottingham Corporation Bill*, which ought to have been noticed before, is, among other things, to empower the Corporation to acquire the undertaking of the Water Company, on terms to be agreed upon between the two parties. There is in this Bill no express desire on the part of the Corporation to make a compulsory purchase. The consideration, supposing the purchase to be effected, may be paid in a gross sum or by perpetual annuities, as may be arranged with the Company, which annuities are to be redeemable at twenty-five years purchase. The Corporation propose to leave it open to Rural Sanitary Authorities now supplied by the Company to purchase such part of the plant as lies within their limits, and either take water in bulk from the Corporation, or find a supply for themselves. We hope that none of these Rural Authorities will indulge in the exercise of such powers as may be afforded them. They will be far better off under the Corporation of Nottingham than if independent. The Corporation seek power to borrow £800,000 for water purposes.

The *Pemberton Local Board Bill* is, first of all, to extend the time for the completion of reservoirs authorized by the Act of 1875, and, further, to empower the Board to construct certain service reservoirs, filter-beds, conduits, &c., which are to be completed within five years after the passing of the Act. For the new works the Board seek power to borrow £40,000.

The *Rochester Corporation Water Bill* is, among other things, to empower the Corporation to purchase the undertaking of the Strood Water-Works Company. The consideration, which, it would appear, is to be settled with the Company, is not set forth in the Bill. The Corporation seek to maintain and continue the present works, and to construct some new, for which they ask power to borrow £4000, and as much as may be required to complete the purchase. The rates for supply which the Corporation propose to charge are about those usually levied. All the other powers ordinarily granted to a water undertaking are prayed.

The *Sligo Borough Water Bill* is to extend the time for the completion of water-works authorized by an Act passed in 1869. It would appear that little has been done towards the construction of these works, and now the Corporation come to Parliament for an extension of time, and also for power to borrow £10,000.

SEWERAGE BILLS FOR 1879.

The following four Bills relate to sewerage schemes, and require but brief notice here :—

The *Dudley Sewage Bill* is to empower the Corporation of Dudley to rent or purchase, from the present tenant for life of the Dudley Estates, lands for a sewage farm, with all necessary approaches and appurtenances thereto. The Corporation have already applied for, and obtained power for the borrowing of £45,000, which will be applicable to the purposes of this Act.

The *Dun Drainage Bill* is to extend the time given by the Act of 1873 to the Dun Drainage Commissioners—which time expires next year—to July 21, 1881. The borrowing powers heretofore conferred are continued.

The Bill of the *Lower Thames Valley Main Sewerage Board* proposes to interfere seriously with the rights of the Chelsea and Lambeth Water Companies. The Joint Board propose to throw their purified (?) sewage into the Thames at the junction of the Mole and Ember with the river, below which the Companies named have their intakes. One object of the Bill now promoted is to prevent the above-named Companies from taking water below the confluence of the Ember after the 1st day of January, 1880. It must be remarked here that the Joint Board ask for two years more—that is, up to 1882—for the completion of their sewerage scheme.

The *West Kent Main Sewerage Bill* is to extend the time for the completion of the works authorized by the Acts of 1875, 1876, and 1877, and further to increase the rate the Board are now empowered to levy, which, by their Act of 1876, was fixed at 1s. in the pound. As a matter of course, more is required, and one object of this Bill is to enable the Board to levy rates to the amount of 1s. 9d. in the pound. It has been discovered that a portion of the district of the Metropolitan Board of Works can be better drained by the West Kent Board, and *vice versâ*, and the Bill proposes that the two Boards should enter into agreements for relieving each other.

GAS AND WATER PROVISIONAL ORDERS FOR 1879.

There are twenty-four applications to the Board of Trade for Provisional Orders, under the Gas and Water Works Facilities Act, 1870, which, when confirmed by Parliament, will have all the force of Special Acts.

The *Aldershot Gas and Water Order* is to authorize the Aldershot Gas and Water Company to raise further capital to the amount of £25,000 by the issue of new shares, it being a condition that the full nominal value of the shares, and whatever premiums may be offered, shall be paid within three months after sale. The usual borrowing powers are asked for. The dividends on the new capital are limited to seven or six per cent., according as it is raised.

The *Cleethorpes Gas Order* is to authorize the Cleethorpes Gas Company to raise further capital to the amount of £20,000, and to borrow £5000. The Order provides that, without the sanction of the Board of Trade, the Company shall not borrow at a higher rate of interest than six per cent.

The *Dorchester Gas Order* is to empower the Dorchester Gas Company to raise further capital to the amount of £17,000, and to borrow £8500. The new shares are to be sold by auction, and the full nominal value, together with the premium, is to be paid up within three months. The dividends are limited as usual, but the sliding scale is applied, the initial price of gas being 4s. 6d. per thousand feet. The quality of the gas to be supplied is to be fourteen candles, tested by the "London" burner. The Order specifies that nothing therein contained shall prevent the Company from supplying artificial light other than that furnished by gas, if any invention should be perfected and made available for the purposes of public and private illumination.

The *Dorking Water Order* is simply to empower the Dorking Water Company to make collecting works and lay some pipes, for which purpose they seek power to raise new capital to the extent of £8000, and to borrow £2000.

The *Dronfield Gaslight and Coke Company's Order* is to empower the Company to maintain and continue works for the supply of the parish of Dronfield, with the exception of two townships. The capital asked for is £24,000, with borrowing power to the extent of one-fourth. Gas of fourteen-candle power is to be supplied, tested by Sugg's "London" Argand burner, No. 1. The price of gas is not to exceed 6s. per thousand feet.

The *Eckington Gas Order* is to empower the Eckington and Mosbrough Gas Company to maintain and continue works for the supply of gas in the parish of Eckington. The capital already raised is £6000, and this Order is to authorize the Company to raise a further sum of £4000, and to borrow £2500. The

dividends on the new capital are limited as usual, and the new shares are to be offered by auction or tender. The gas supplied is to have the illuminating power of twelve candles, and the price is not to exceed 7s. per thousand feet.

The *Enfield Gas Order* is, first of all, to empower the Enfield Gas Company to acquire the undertaking of the Ponder's End Gaslight Company. The Order prays for power to raise additional capital to the amount of £24,000, £11,625 of which, secured by the issue to the Shareholders, *pro ratâ*, of six per cent. preference stock, is to be applied to the purchase of the Ponder's End Gas Company. Further than this, the Order is to authorize the Enfield Company to dispose of any lands and works they do not consider necessary for their purpose, the money realized by the sale to be added to the capital account. Of course, the usual borrowing powers are asked for. Nothing is said about the quality and price of gas, which, we presume, will remain as fixed by the Enfield Gas Act of 1867.

The *Havant Gas Order* is to authorize the Havant Gas Company to maintain and continue works for the supply of gas in Havant and the neighbouring parishes. The Company have already raised £3000, and this Order will empower them to raise additional capital to the amount of £10,000, and to borrow to the usual extent. The original capital, and such part of the new as may be issued in ordinary shares, will be entitled to ten per cent.; if the latter be raised as preference, the dividend will be limited to six per cent. The gas supplied is to have the illuminating power of fourteen candles, tested by the "London" No. 1 burner, and the standard price, subject to the sliding scale, is to be 5s. 6d. per thousand feet.

The *Herts and Essex Water-Works Order* is to authorize Messrs. Russ and Minns to construct water-works for the supply of Sawbridgeworth and other parishes in the counties of Hertford and Essex. The undertakers seek power to embark capital to the amount of £40,000 in the project. The source of the water is to be a well in the parish of Sawbridgeworth. The ordinary powers of a Water Company are asked for, and the rates proposed to be charged are about as usual.

(To be continued.)

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

CLXXI.

THE TREATMENT OF RESIDUAL PRODUCTS.

Creosote Oils or Pitch Oils—Heavy Oils of the French Tar Distillers.

The term creosote is often loosely applied to the heavier oils of tar. The term is incorrect, as creosote, or, as it is sometimes spelt, creasote, is only applied with propriety to a substance derived from wood tar. The so-called coal-tar creosote is really a mixture of the substance known as hydrate of phenyl, phenic acid, phenol, phenylic alcohol, or carbolic acid, with various hydrocarbons. There will also be present some homologues of carbolic acid. For a complete account of these substances, the reader is referred to works on chemistry, especially Watts's "Chemical Dictionary."

It has been said that the tar, after having been distilled in a current of steam until the specific gravity reaches 0·850, is to be run out into tar-ponds, or other convenient receptacles. For the purpose of being converted into pitch and creosote oils, it is pumped into stills made of ½-inch boiler-plate. They hold about 7000 gallons each, and are heated by direct fire. As boiled tar, from the quantity of water which it contains, is very liable to boil over, the greatest precautions must be taken during the distillation. As these stills are generally horizontal, at least two feet of working space should be left in the still, and the fire must, at the commencement of the distillation, be applied very gradually. There should be valves in the still, so arranged that, if the tar should boil over, it would not reach the head of the still, but come over at a somewhat lower level, and be received in a place at a safe distance from the fire. If such an accident should occur, it will entirely arise from mismanagement of the fire; and as such a result may be attended with serious consequences, only steady and very experienced hands should ever be employed at the pitch-stills.

The distillation may be carried on until about 320 gallons of creosote oil have been received for every 1000 gallons of boiled tar.

The operation is to be pushed to a greater or less extent, according as the residual pitch is desired to be hard or soft. As this varies with the nature of the tar, it is impossible to give directions which shall apply to every case, and the still-man must be guided by his knowledge and experience.

The first 200 gallons may be used up in the naphtha-house. They will require three treatments with oil of vitriol, and the same number with soda. Naphthas of high boiling point always require more soda than light ones, because they contain more carbolic acid and its homologues. The first two puncheons, properly washed, should yield 120 gallons of naphtha fit for burning, and of a specific gravity of about 0·860.

The pitch may, at the end of the distillation, be run into blocks at once, or it may be converted into asphalte by admixture with ground chalk and sand. The quantity of pitch will vary according to the extent to which the distillation has been pushed. It may be said, roughly, that it will amount to from 35 to 55 per cent. of the boiled tar used.

Such is an outline of the method of distilling green tar in a current of steam; or, as it has for convenience been called, the "Scotch process."

It is considered absolutely necessary that the tar distiller should study all the methods given, because they all have advantages under certain circumstances; and, to avoid tedious repetitions, each will be found to contain some manipulations which may be employed with success by all tar distillers, no matter which system they adopt. Thus, the special requirements of the aniline colour manufacturers demand the production of a pure benzole, in order to enable them to obtain pure aniline. Coupier's rectifying still, first used by the French, is admirably adapted for this purpose. It will be described under the head of "Properties of Benzene," &c.

We were particularly careful, at the commencement of the description of the methods of distilling coal tar, to state that few distillers adhere absolutely to any of the systems we have described, each having his own method, which is often a composite one. In Scotland and in England, the processes we have called English and Scotch, are often so modified as, in many respects, more nearly to resemble the French. Thus, some Scotch distillers heat the tar in jacketed stills until the lighter oils have come over; the tar is then transferred to another still, and the process is completed by the naked fire. We shall describe the methods of separation and purification more minutely under the head of "The French System," and also in describing Coupier's still.

The French System of Distilling Tar.*

The French tar distillers, in order to effectually prevent the danger of boiling over of the tar during distillation, to which we have more than once alluded, take especial care to remove the ammoniacal liquor at the outset. For this purpose they introduce the green tar into large vessels made of strong boiler-plate. These are sometimes jacketed, so as to allow of their being heated by steam. Other tar distillers prefer a steam coil, and this plan has many advantages; but the greater number prefer heating by the naked fire. When the latter plan is adopted, great care is taken in so arranging the brick-work setting of the still that over-heating, and, consequently, boiling over, is prevented. The still head is connected with a worm, well cooled with water, which ensures condensation of the more volatile oils. The fire is carefully regulated, so that the contents of the still are very gradually heated up to 80° or 90° C. = 176° to 194° F. This temperature is to be kept up until the tar and the water have separated into two layers. It is impossible to give even an approximate idea as to the time required to effect this separation; it varies with different specimens of tar, even when obtained from the same gas-works, and much must be left to the intelligence and experience of the still-man.

By using this method, the separation is effected in exactly the opposite way to that which has been described under the English and Scotch systems. The tar, instead of sinking to the bottom, rises to the surface in a semi-fluid form. The separation having been effected—which may be easily ascertained by having cocks placed at different heights in the still—the ammoniacal liquor is run off by means of a tap in the bottom. When the line of separation of the tar and liquor is reached, a mixture of the two is obtained; but the running off must be continued until pure tar comes away. The mixture of tar and liquor is then added to the stock of green tar; but the dehydrated tar is pumped, while hot, into the tar-still.

Although the distillation of coal tar is, compared with most chemical processes, a very simple operation, it is, as we have said before, not without its dangers. The volatile products form so large a proportion of the whole, that the contents of the still are, at the end of the operation, reduced to half the original volume. It is obvious, therefore, that the flues should be so arranged as never to rise higher than the level of the pitch at the end of the distillation. In fact, the fire should not be permitted to reach even so high, because, if the pitch become over-heated, violent and dangerous explosions may occur. If the pitch be over-heated, it becomes coked, which involves loss.

We have said that the still, which is set horizontally, should be made of strong boiler-plate, and the bottom—the part most liable to injury—should be thicker than the sides. The size of the still must depend upon the amount of tar which will have to be operated upon. Its form should be cylindrical, and it must be so set in fire-bricks as to be protected from the direct action of the fire. The still should be so set that the end from which the pitch is run out should be a little lower than the other, so that the fluid pitch can be completely removed at the termination of the distillation.

We have insisted strongly on the extreme inflammability of the vapour of naphtha, and have, in our description of the English process, advised that the worm should be separated by a brick wall from the still-house. A somewhat similar precaution is necessary here. It is true that, at the end of a tar distillation, we have no light naphtha vapour to deal with; but, on running out the pitch, dense and inflammable vapours are evolved, which are no less dangerous. It is necessary, therefore, that the pitch-cock should be separated by a wall from the boiler and its fireplace.

In the French system of distillation, three worms are used. By means of a proper system of taps, the vapours as they come over can

* The writer is greatly indebted for much of his knowledge of the French system to the "Traité des Dérivés de la Houille" of his talented friends MM. Girard and De Laire, and to information received from his friends MM. George Nicaise and others.

be directed into one or the other, as desired. The operation can therefore be divided into three epochs, and thus becomes a fractional distillation. In describing the English and Scotch methods, other arrangements are given which really effect the same thing.

At the junction of the head with the still there is a gutter (as in the old alembics), which enables the oils and liquor condensed in the head itself to be carried to the coolers. This prevents their falling back into the still; in which case, if much water were present, there would be a danger of boiling over. A thermometer should always pass through a hole in the head. This will enable the still-man to know into which cooler to direct the products.

The extent to which the distillation is to be carried depends upon the quality of the tar, and also upon the kind of pitch required. There are three kinds recognized among the French distillers, namely:—

1. Liquid, or thick pitch; 2. Fat pitch; 3. Dry pitch.

They only differ by the greater or less quantity of heavy oils which they retain. The first contains all, the second less, and the third none. No. 1 may be obtained by distilling over water and the light oils, and may therefore be compared to the Scotch boiled tar. No. 2 is made by leaving only a small quantity of heavy oil, and is comparable to a Scotch pitch of a moderate hardness. No. 3 is obtained by carrying on the distillation until no liquid oils remain. In the cases given the tar loses the following percentages of its weight:—

No. 1	loses	25 per cent.
„ 2	„	30 to 40 „ „
„ 3	„	40 to 50 „ „

At the commencement of the distillation, the heat must be applied with all the precautions we have given in describing the English system, to prevent frothing. The first products are ammonia and permanent gases. Then ammoniacal liquor and a yellow oil lighter than water. The still is then heated more strongly, and the oil gradually acquires a higher specific gravity, and, at last, it sinks in water. As a rule, naphthalene does not come over in sufficient quantity to solidify, until 30 per cent. of the total charge has come over. This is the moment to arrest the distillation, if dry pitch be required.

At this stage the pitch in the still solidifies, on cooling, into a vitreous mass, having a conchoidal fracture. If the heat be then raised to dull redness, anthracene, contaminated with several impurities, comes over as a yellowish semi-solid substance. Finally, an orange powder makes its appearance.

The still at this point contains a fine, hard brilliant coke, burning with difficulty. The writer has found this "pitch coke" an admirable fuel for heating some of the chemical furnaces used in research, notably Luhme's.

Fenner and Versmann state that the products coming over between 315° and 370° C. = 600° to 700° F. are rich in anthracene, and only contain a small portion of chrysene or naphthalene; above 370° C. = 700° F., chrysene, and other substances of higher boiling-point than anthracene, being the principal products of the distillate. This agrees with the observations of the writer, who obtained the chrysene he employed in his examination of chrysene * from the orange powder mentioned above, as the last product obtained in distilling pitch.

(To be continued.)

* *Chemical Gazette*, 1855, p. 406.

Correspondence.

[*We do not hold ourselves responsible for the opinions expressed by Correspondents.*]

LOW-PRESSURE BURNERS.

SIR,—In consequence of press of business, the letter of your correspondent, Mr. G. Bray, in the JOURNAL of Feb. 18, was overlooked by me until my attention was particularly drawn to it. As the statements made therein are calculated to mislead those of your readers who are not acquainted with the facts relating to improvements in gas lighting, permit me to furnish the following particulars.

During the discussion, after Dr. Wallace's lecture, I incidentally stated that I was the inventor of the "hollow-top steatite burner"—a burner which is shown in Dr. Wallace's reports to give very excellent results. The date of the production of my original model was about Christmas, 1867. It was made in my workshop, and the workman who made it is still in my employ. It was my intention to have patented it in this country, but I was prevented from doing so. At that time steatite articles were not manufactured in England, for want of the suitable steatite. I therefore sent my model over to Germany (as I had long been in the habit of doing), to a manufacturer to make it for me in steatite. He had been for years in business relations with me, and had made from my models my first Argand tops, and my street-lamp and other burners in steatite. On this occasion, however, he thought proper to appropriate the model sent him in confidence, and make and sell these burners in several parts of Germany before sending me any of them. My friend and correspondent, Herr Christopher Friedleben, one of the most eminent German Gas Engineers (well known in England), sent me some of the first samples of my hollow-top steatite burners, with the remark that they were "the finest flat-flame burners he had ever seen." Thus, having been published in Germany without my knowledge or consent, they could not, I was advised, be patented in England. Of course, my business relations with the German manufacturer were immediately closed.

The burners mentioned by your correspondent as being patented in 1860 are *metal* burners. I observe that the patentees specially claim the idea of hollowing the top of the solid burner. There the resemblance to my burner ends, for metal burners of any kind do not give so good results as steatite burners. Justice Quain, sitting *in banco* with the Lord Chief Justice and Justice Mellor, asked the following question relative to a gas-burner, which, he was assured, was similar to, and, in fact, an anticipation of the "London" Argand burner:—"Does it give results equal to the 'London' burner?" The answer was, "No." "Then," said he, "if it is the same thing, why does it not?" For the same reason, I say, that the burner mentioned by your correspondent is not the same thing as my hollow-top steatite burner.

It is also fair to assume that your correspondent himself is perfectly convinced that Mr. Wadsworth's metal burner does not give so good a result as my steatite hollow-top, or he would not have patented, as he says he has, the hollow-top burner manufactured in the material he calls "enamel," which, if his patent is to hold good, must produce better results than either. On applying for his patent, he made a solemn declaration that he was the true and original inventor of the hollow-top burner—made in enamel—and he holds the patent granted him on the condition that the results to be obtained from the burner thus made shall be superior to those obtained from either Wadsworth's metal or my steatite hollow-top burners. Failing this, he has no patent. From the foregoing, it is clear that the fear which your correspondent expressed, lest the honour of inventing the hollow-top steatite burner should be misplaced, is entirely groundless. As to the relative merits of "steatite" and "enamel," any of your readers can easily set this point at rest by making a trial of both.

Having disposed of the main question, I may now say that until yesterday I had never seen the patent of 1860, mentioned by your correspondent. I am tolerably certain also that the burner shown in their specification—of solid metal with a hollow top—was never published by the patentees. They say that the hollowing of the head is done by a tool made expressly for the purpose, but not in any way described. This operation, though quite easy in such a material as steatite, which in the unburnt state is as soft as ivory, is very difficult to carry out commercially in brass or iron; and as the patent is principally for the manufacture of gas-burners out of sheet brass, by the process of "stamping," "knurling," or "milling"—all of them much easier operations—it is more than likely that the solid burner was only included in their specification to prevent any unscrupulous person from jeopardizing their patent by making the improved hollow-top burner in solid instead of sheet metal. The millions which your correspondent says have been made must, I think, be of the latter class. I have never met with any specimen of the former.

Your correspondent also finds fault with my statement—rather loosely expressed, it must be confessed—in your report (which I see is not verbatim) "that the Sugg-Letheby burner was the first step in the direction of consuming gas at low pressure." I believe I said *properly* consuming gas at low pressure. I meant to have said so, if I did not. The prototype of the Sugg-Letheby burner, differing only from the latter in the dimensions of the central aperture, was proposed as a standard burner by Mr. George Lowe, before a Committee of the House of Commons, in 1858, but did not become a standard until 1863, when it was adopted by Dr. Letheby for testing the gas supplied to the City of London, and it became known as the "Sugg-Letheby" burner. This burner was considered at that time, by the most eminent Engineers, such as Messrs. George Lowe, F. J. Evans, T. N. Kirkham, and other authorities, including the late Dr. Letheby, as the first step in the development of the proper illuminating power of gas.

Having now taken up so much of your valuable space in stating these facts, permit me to remark that the authoritative statement of your correspondent, that "we have no steatite burners made in England," is erroneous in any other sense than as applying to his own firm. If by "we" he means the people of England, he is wrong, for there is at the present moment a large quantity of steatite burners in use which have been entirely manufactured by me at my works in Westminster, and are generally considered to be excellent. Among the steatite burners thus made are those now in use in Waterloo Road, Lambeth; Waterloo Place, Regent Street; and Queen Victoria Street, City; and also the two large burners which attracted so much attention at the Society of Arts on the evening of Dr. Wallace's lecture.

In conclusion, I should like to be permitted to ask your correspondent three questions:—1st. What is the difference, if any, between "Leoni's adamas" and "Bray's enamel"? 2nd. Why he thinks the "hollow-top" burner ought to have its name changed to the "slit union"? Lastly. Whether he has found that "enamel" burners give better results in illuminating power than either steatite or adamas?

A reply to these questions will, I am sure, be acceptable to your readers, as well as to those who, like myself, were deprived of the pleasure of his company on the evening of the lecture.

WILLIAM SUGG.

Vincent Works, Westminster, S.W., Feb. 27, 1879.

BRIDGEND GAS AND WATER COMPANY.—At the last half-yearly meeting of this Company—Mr. T. G. Smith presiding—the report of the Directors was adopted, and a dividend at the rate of 3½ per cent. on the original and preference shares declared.

PORTSMOUTH WATER-WORKS COMPANY.—The annual meeting of this Company was held on Thursday, the 20th ult., when a dividend at the rate of 9 per cent. was declared. The last half year's revenue of the Company was £15,378 3s. 9d., of which £9702 9s. 10d. was carried to the profit and loss account. The capital of the Company is now estimated at £242,843.

LECTURE ON ILLUMINATING GAS AT RUNCORN.—A very able and interesting lecture on "Illuminating Gas" was delivered last week, under the auspices of the Runcorn Literary Institute, at the Runcorn Gas-Works, by Mr. J. R. Frith, the Manager of the works. Mr. Frith, in opening his lecture, said he had on a former occasion lectured on the history and manufacture of illuminating gas, and his lecture that evening would be on its properties, and the most effective and economical mode of using it. He exhibited a variety of burners, and showed the almost instantaneous diffusion of gas through unglazed earthenware and plates of plaster of Paris, pointing to the necessity of pipes used for sanitary purposes being of a vitreous nature or highly glazed, as gas could not pass through them. He then alluded to the opinion held by many people, of the danger of gas exploding in the holders at gas-works, and showed the fallacy of it by several experiments. The lecture throughout was highly pleasing and instructive, and the audience showed their appreciation of it, and the experiments which were exhibited with elaborate scientific apparatus of the first order, by frequent outbursts of applause. At its close, a hearty vote of thanks was accorded to Mr. Frith.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, FEB. 24.

The following Bills were read a second time:—Dudley Sewage; Dun Drainage; Llandudno Improvement; Rathfarnham and Terenure Township; West Kent Main Sewerage.

TUESDAY, FEB. 25.

Colwyn Bay and Pwllycrochon Estate Bill,—presented, read the first time, and referred to the Examiners.

A petition against the Dudley Sewage Bill was presented from the Birmingham Canal Company.

THURSDAY, FEB. 27.

Petitions against the following Bills were presented:—Llandudno Improvement, from Hugh Thomas Davies Griffith; West Kent Main Sewerage, from Earl Sydney.

FRIDAY, FEB. 28.

A petition against the West Kent Main Sewerage Bill was presented from the Conservators of the River Thames.

HOUSE OF COMMONS.

MONDAY, FEB. 24.

The following Bills were read a second time and committed:—Aldrington Water; Arlecdon and Frizington Water; Belfast Water; Birmingham Corporation Water; Birmingham Gas; Cardiff Corporation; East Retford Water; Glasgow Corporation Water; Grand Junction Water; Houghton-le-Spring District Gas; Nelson Local Board; Pemberton Local Board; Rawmarsh Local Board; Rochester Corporation; Sleaford Water; Westgate and Birchington Gas and Water.

Leeds Corporation Bill,—read the first time, and ordered for second reading.

The Examiners reported the further Standing Orders had been complied with in the case of the following Bills:—Aire and Calder Navigation; Brighton and Hove Gas; Bury St. Edmund's Gas; Crystal Palace District Gas; Gaslight and Coke Company; Ilkley Gas; Mirfield Gas; Nottingham Water; Preston Gas; Southend Water; South Shields Gas; Stourbridge Gas; Weardale and Shildon District Water; Wisbech Gas.

A petition praying that the Standing Orders might be dispensed with in the case of the Alliance and Dublin Consumers Gas Bill was presented from Frontagers and occupiers of property abutting upon Great Clarence Street and Cardiff Lane.

Petitions against the following Bills were presented:—Gaslight and Coke Company, from Corporation of the City of London; Brighton and Hove Gas, from New Shoreham Local Board; Manchester Corporation Water, from John Fletcher; New River Company, from Corporation of the City of London; Nottingham Corporation, from (1) Percy Hartshorne Cooper, (2) Thomas Alfred Mann, (3) Thomas Moore and others; Nottingham Water, from Corporation of Nottingham; South Shields Gas, from Corporation of South Shields.

TUESDAY, FEB. 25.

Tipton Local Board Bill,—read a second time and committed.

The following resolutions, reported from the Standing Orders Committee, were agreed to:—(1) "That, in the case of the Alliance and Dublin Consumers Gas petition, the Standing Orders ought to be dispensed with: That the parties be permitted to proceed with their Bill." The Bill was then ordered to be brought in by Sir Arthur Guinness and Mr. Maurice Brooks. (2) "That, in the case of the Colchester Water petition, the Standing Orders ought to be dispensed with: That the parties be permitted to proceed with their Bill, provided that clause 54 be struck out of the Bill: That the Committee on the Bill do report how far such order has been complied with on the report of the Bill." The Bill was then ordered to be brought in by Colonel Jervis and Mr. Cobbold.

Glossop Gas Bill, Knutsford Light and Water Bill.—The Examiners reported that the further Standing Orders had been complied with.

Petitions against the following Bills were presented:—Belfast Water, from the Right Hon. Alexander Nelson Viscount Bridport and Colonel Bateson (as trustees of the estates of the Marquis of Downshire); Nottingham Water, from the Hucknall Torkard Local Board of Health.

LANCASHIRE AND YORKSHIRE WATER SUPPLY.

Mr. E. S. HOWARD rose to move—"That an humble address be presented to Her Majesty, praying Her Majesty to issue a Royal Commission to inquire into the supply of water to the manufacturing districts of Lancashire and the West of Yorkshire, and any deficiencies likely to arise therein; and, whether it is necessary or expedient to resort to the Westmoreland and Cumberland Lakes to make good any deficiencies in such supply; and, if so, to what extent, and under what conditions, such resort should be sanctioned." In doing so, he said that he felt it necessary to submit the reasons which induced him to call attention to this subject a second time. Last year he placed upon the paper notice of a similar motion, but was compelled to postpone it, and he then raised the question by moving the rejection of the Manchester Corporation Water Bill, stating that, if he was successful in obtaining the rejection of the Bill, he should move for a Royal Commission. The reason of his opposition to the Manchester Bill was that it was a Bill of too great public importance to be dealt with by a private Committee, but demanded a careful investigation. Last year the Government had appointed a Select Committee to go into this matter, and to report fully thereon, and because the principle on which the opposition to the Bill was recognized in the appointment of the Committee, the opponents of the Bill agreed to the proposal. But how did this Select Committee proceed? They commenced at once to take the Manchester Bill, and treated it almost entirely as between promoters and opponents. They did not seem to have sought any further evidence than the limited means which the Association, which had been formed for the protection of Thirlmere, was enabled to supply. It was impossible for that Association, with their limited means, to present such elaborate plans and details as Mr. Bateman, the Engineer to the Manchester Corporation, was able to produce. The Corporation also had the services of Sir Edmund Beckett, who treated the evidence of the opposition in his usual complimentary manner, and the Committee seemed to have adopted his views. They said, moreover, that the evidence which had been adduced as to the supplies which might be obtained from other sources was unworthy of consideration, and thus simplified their task by assuming that there was no other water supply. He (Mr. Howard) had been told that evidence was offered to them of an entirely new and most comprehensive scheme, and that they declined to go into it. He maintained, therefore, that the opponents of the Bill had raised a *primâ facie* case that there were other sources of supply, and that the Select Committee ought to have gone farther than they did. The Committee seemed to accept without inquiry the statements of the promoters of the Bill. For example, when the Bill was first introduced, a deputation from Manchester waited on the Chairman of Ways and Means, and, in presenting their case, the Mayor of Manchester said that the number of people the Corporation had to supply with water was 800,000. But a few weeks afterwards it was stated before the Committee by the promoters of the Bill, that the number was over 900,000. One of the main allegations of the Bill was that in less than 10 years there would be a deficiency in the supply of water, at the present rate of increase in the population. The present supply, it was stated, was 25 million gallons to close upon 1,000,000 inhabitants, and it was argued that, before 10 years were over, Manchester and the surrounding districts would have increased to 1,300,000. Therefore it was contended, as there would be a deficiency of water supply in 10 years, there ought to be no delay in carrying out the Bill. This calculation was arrived at by taking the number of additional houses and warehouses erected each year in Manchester and the neighbourhood, allowing five persons to each house. That was the way the estimate was arrived at that Manchester and the neighbourhood would increase to a great extent. It ought to be remembered, however, that the time at which these calculations were made was a time of exceptional prosperity, and those particular years could not therefore be a fair test. In support of this assertion, he would refer to the report of the census, the figures of which told a different tale. The increase in the population which would take place in 10 years, as estimated by the Select Committee, was 39 per cent., whereas the increase according to the census was not more than 12½ per cent. Therefore, the estimate of the Select Committee was formed on entirely erroneous information. This was a scheme which involved an outlay of nearly £4,000,000, which would probably reach £6,000,000 before the works were finally executed. The inquiry in such an investigation as that undertaken by the Committee was entirely inadequate to the importance of the subject, and therefore he considered they had failed to give the matter that attention which the public had a right to expect. They passed the Bill finally, with alterations, but ultimately it was rejected in the other House. It was notorious that the object of the Bill, as first presented, was to obtain a monopoly of the water, and sell it to the towns for as much as they could get. It was being introduced this year in accordance with the proposals of the Select Committee. For this reason he would ask the House to pause once more before taking action on the scheme—a scheme which involved not only so many changes in scenery which they all so much prized, but involved an outlay equal to that which the House of Commons had lately, after considerable discussion and hesitation, voted for the preservation of the peace of Europe. He would ask the House, before sanctioning the scheme, to insist upon a thorough inquiry into the water supply of this district. The importance of the subject was self-evident, and needed no demonstration from him. He had shown that the investigation of the Committee was not commensurate with the importance of the subject, and that the estimate of increased population was very much exaggerated. The reason why Manchester should be short of water in a few years was said to be owing to the fact that the present water-works had cost much more than had been estimated, and the Corporation had been obliged to sell the water which was intended for future generations. The water, it was alleged, had been sold to the new manufacturing houses and warehouses in the neighbourhood, and, just as the present depression of trade was said to be due to over-trading, so the water supply of Manchester would fail from a similar cause. He thought that delay in this case could not be called a misfortune to Manchester, but would rather be a great boon, by delaying or preventing the execution of this scheme, which, by involving such an enormous outlay, would probably tend as much as anything else to prolong the depression and distress from which the country was suffering. For this reason he would ask the House to agree to his motion. If a Royal Commission were appointed, the results contemplated by the Manchester Water Bill might be attained in a less objectionable manner, and if the Commission should decide that it was right and proper to make use of the Lakes, they would lay down some limitation as to the alterations in their usual features and characteristics. If, on the other hand, this Bill was allowed to pass, and the Royal Commission was not granted, and Lake Thirlmere was not to be left in its ancient condition, he supposed they must submit. He was afraid if that was the case there would be many people, although he was not one of them, who would agree with what had been said by a well-known professor, that "rather than see the waters of Thirlmere brought to the tops of the houses of Manchester, he would prefer to see the houses of Manchester brought to the bottom of the waters of Thirlmere." The honourable member concluded by reading his motion.

Mr. WHEELHOUSE, in seconding the motion, said that it was most necessary, in the interest of the West Riding of Yorkshire, to have this question of water supply from Thirlmere fully inquired into. No one would be more willing than himself to see a good supply of water given to Manchester, but at the same time the Thirlmere scheme was one of the most expensive that could be possibly devised by the Corporation of Manchester or any other body. They had quite close to them, in Derbyshire, one of the most admirable gathering-grounds that could be imagined—a gathering-ground which would give a supply of most excellent water. In this district they could obtain a supply of water for any length of time, and procure it at a rate infinitely less than it would cost to obtain it from the Cumberland Lakes. While giving the people of Manchester all credit for a proper comprehension of their own affairs, he believed the idea of gathering the water for the legitimate supply of Manchester on the spot where it could be put to the greatest advantage, had never been thought of practically until the Thirlmere scheme had taken possession of certain minds in the Corporation. Again, the Corporation themselves were by no means unanimous in this matter. They knew very well that, in the first instance, it was the intention of the Corporation to become practically a huge association of dealers in water, and that if they had succeeded in passing their Bill in its original form, they would have proceeded to make terms for the supply of water to other towns. They also knew, as a matter of fact, that if the Corporation of Manchester succeed in getting the Bill in its amended form, and were allowed to appropriate the Lake, a precedent would be set up for other towns to follow, and they would come to Parliament and say, "We want this lake and that lake," with the inevitable result that at last there would remain no available source of supply for West Yorkshire. Leeds and other large towns could not be said to have a bad supply of water; but when they came to the smaller manufacturing towns and villages of the district running from Todmorden to the east of Leeds—a very wide area—they found that immense distress had existed on account of the general want of an adequate supply of water. To allow any one Corporation, therefore, to say to the inhabitants of West Yorkshire, "We will appropriate by parliamentary powers, if we can get them, the whole of a large lake, and you may get your supply as best as you can," would be a matter calculated not only to irritate, but to work public injury. It was, therefore, with very great cordiality that he asked, on behalf of those who surrounded him in the neighbourhood of Leeds, that, before any legislation took place on the question, they should have what was asked for—namely, a full and searching inquiry, not only for Manchester itself, but for the entire district to which he had referred. The whole question should be entered into, and it should be ascertained whether Manchester might not confine itself for a water supply to the immense resources

afforded by the rivers and other head waters in its vicinity. If it were possible to obtain water so close at hand, such sources would be better utilized for the purposes of Manchester than that contemplated by the Thirlmere scheme. In conclusion, he would again cordially press upon the House the advisability of adopting the motion.

Mr. Birley had heard with great surprise and regret the speech of the honourable member for East Cumberland, and especially the attack he had made on the Committee, who had been chosen with great care, and were as competent to deal with the whole question as any Royal Commission that could be appointed. The report of the Committee had been adopted with singular unanimity by the district to be benefited by the scheme. At the statutory meeting in Manchester a poll was demanded, when 40,000 voted for the scheme, and 3000 against it. A Commission such as that recommended was not required. No real practical object would be served by it. It could only tend to obstruct the Manchester scheme, at whatever cost and inconvenience to a population approaching a million. It was not the constituents of the honourable member who desired this motion to be carried; only a few persons were apprehensive that the picturesque beauty of Lake Thirlmere might be interfered with. But those fears were purely imaginary. Care would be taken to avoid all unnecessary interference, and many owners in the district had already been satisfied. He hoped that the motion would not be accepted by the House.

Mr. A. H. Brown was of opinion that the House should not appoint a Royal Commission as proposed. The whole question of water supply was one which deserved the attention of the House. He complained that the practice of referring Water Bills to separate Committees led to a want of uniformity in the action of those Committees, and suggested that a number of experienced members of the House should be chosen to consider all the water schemes submitted, as by this means he considered that uniformity in legislation would be preserved, and justice done.

Mr. Sclater-Booth: The House will hardly expect that the Government will be prepared to assent to the appointment of a Royal Commission on the statement which we have heard from the honourable member who proposed the motion. The statement he made was of a very limited character, and resolved itself into the details of what is known as the Thirlmere water scheme—which will, I believe, be before the House to-morrow—and the view the Committee took of the matter last year. I should have thought, in bringing such a subject forward, the honourable member would have done so on broader grounds—that he would have attempted to show that the Lake districts were being injured, and that the water supply to some localities was in danger, in consequence of a preference being given to certain large towns over other of their smaller neighbours—indeed, I should have supposed that the honourable member would have brought forward a case which unmistakeably called for the intervention of Parliament; but in that respect he has, I consider, entirely failed. The question of a Royal Commission on the subject of water supply is not a new one. It was brought forward in 1874, and it was again discussed by the Society of Arts in the early part of last year; and had the honourable member proposed this Royal Commission upon broader grounds, I should have shown him ample reasons why it should not be appointed. We have already had the conclusions of the Duke of Richmond's Commission upon the subject, and we have the report of the Royal Commission on the Pollution of Rivers, in which a number of suggestions and a quantity of statistical information have been given, more or less bearing upon this subject. There are also other reports—Blue-Books, and notices having reference to water supply generally—which are open to general inspection, and are of a most valuable description. If I had been challenged as to the grounds upon which I objected to the motion, I should have simply said that I did not see what end could be gained by appointing a Commission. The Public Health Act of 1875 greatly increased the powers of Local Authorities with reference to water supply, and protected them against Water Companies, and under that Act large sums of money are being borrowed for the purpose of water supply. Again, we are indebted to the right hon. gentleman opposite (Mr. Forster) for the Committee which sat last year, and which greatly assisted the Local Authorities in obtaining water from connections passing through their districts. That Committee, I consider, obtained ample information, and the Bill which was before them came out a good and improved measure. Having thus dealt with the general subject in the way I have mentioned, the motion does not commend itself to my mind, because it is not only an attack upon the Committee of last year, but it is also an attack upon the Thirlmere water scheme which is to come before us on another day. The House was not prejudiced by that scheme last year. It was read a second time after ample discussion, it was referred to a hybrid Committee, and when that Committee were appointed the whole subject was left to them. The Committee amended the Bill, and reported in its favour, and it was lost in the House of Lords because the promoters accepted the suggestions of the Committee, and embodied them in the Bill. It has now been revived, and the Manchester ratepayers have strongly supported the policy of the Corporation in bringing the subject again before the House, and the Bill, I believe, is set down for second reading to-morrow. I cannot therefore see what the House would gain by accepting the motion, and thus delaying the second reading of a measure which comes to us so strongly supported. The honourable member for Leeds went so far as to admit that there was an ample supply of water for Yorkshire itself already existing; but that is not the case at Manchester. Manchester, however, does not seek to monopolize the Lakes; but, on the contrary, a large population will be supplied by the aqueducts which carry the water. Under these circumstances, I do not see that any case has been made out for a Royal Commission. Whether the Committee did all the honourable member thinks they ought to have done or not, I am not prepared to say; but if he desired to challenge the conduct of the Committee, I think he should have done it by a more specific motion, so that the members of the Committee might have been prepared to meet it, and made aware that their conduct was under examination. It is a little unusual to make such attacks as the honourable member has levelled at the Committee, without giving the members of it notice, and we shall be led into endless controversy if the action of every Committee is to be brought in review before the House, as has been the case here. If the Committee obeyed the instructions given to them by the House, they were not very different from what the honourable member would give to a Royal Commission; and the House will see that the Committee did obey their instructions, because they improved the Bill in a manner acceptable to the House, and put the whole subject in a form which, I believe, is still further developed in the Bill of this year. On the part of the Government, therefore, I may say that we do not feel called upon, simply upon the grounds stated, to appoint a Royal Commission on this subject.

Mr. W. E. Forster, who had taken considerable interest in the Thirlmere scheme, particularly as one involving interference with Lake scenery, could not support the motion, and hoped his honourable friend would not divide the House. Looking at the matter from the point of view in which he was most interested, he did not see what advantage could result from a Royal Commission. In fact, he feared that it would result in a greater interference with the Lake district than was now proposed. The subject had been long debated, and he thought the promoters of the Bill had a good case. The hybrid Committee appointed last year gave great consideration to the subject. It was a Committee which included many able men, and they made certain recommendations, which the promoters accepted, and it was in consequence of that that they lost their Bill in the House of Lords. That, he thought, made out a strong case for them before the House this year, and he should do nothing which he thought would obstruct the passage of the Bill.

Mr. Raikes said that the honourable member for East Cumberland was not open to censure for bringing this subject forward. He thought that the House should be in possession of more of that official information which the Local Government Board appeared to be in possession of on this subject. The course which the honourable member had taken in this matter was perfectly regular; but, under the circumstances, he suggested that the motion should be withdrawn.

Dr. Playfair said that he had the honour of being Chairman of the hybrid Committee, who devoted so much attention to this subject; and considering the labours of that Committee, and also those of a Royal Commission appointed by the Duke of Richmond and Gordon, the appointment of another Committee now would be like throwing doubt on the labours of the Committee and the Commission who had already inquired into the matter. He hoped the motion would not be pressed to a division.

The motion was then withdrawn.

Wednesday, Feb. 26.

Dearne Valley Water Bill,—read a second time, and committed.

Petitions against the following Bills were presented:—Aldrington Water, from Shoreham and District Water-Works Company; Blackburn Improvement, from Edward Petre; Blackpool Extension and Improvement, from St. Anne's-on-the-Sea Gaslight and Coke Company, Limited; Cardiff Corporation, from Cardiff Water-Works Company; Lower Thames Valley Main Sewerage Board, from (1) West Middlesex Water-Works Company, (2) Edward Raphael; Mirfield Gas, from (1) Ravensthorpe Local Board, (2) Mirfield Local Board.

Mr. Isaac and Serjeant Spinks gave notice that on the second reading of the Lower Thames Valley Main Sewerage Board Bill, which is appointed for Friday, March 7, they would move—"That it be read a second time upon this day six months."

Thursday, Feb. 27.

Alliance and Dublin Consumers Gas Bill, Colchester Water Bill,—read the first time, and referred to the Examiners.

Manchester Corporation Water Bill,—read a second time, and committed.

Petitions against the following Bills were presented:—Belfast Water, from Belfast Harbour Commissioners; Blackburn Improvement, from (1) Owners and occupiers of mills, &c., in Livesey, (2) Lancashire and Yorkshire Railway Company; Cardiff Corporation, from Marquis of Bute and his Trustees; Crystal Palace District Gas, from Metropolitan Board of Works; Dearne Valley Water, from (1) Corporation of Wakefield, (2) Corporation of Rotherham; East Retford Water, from Corporation of East Retford; Glossop Gas, from (1) Hollingsworth Gas Company, (2) Inhabitants of Tintwistle; Ilkley Gas, from Ilkley Local Board; Leeds Corporation, from Lancashire and Yorkshire Railway Company; London Gaslight Company, from Metropolitan Board of Works; Lower Thames Valley Main Sewerage Board, from Conservators of the River Thames; Manchester Corporation Water, from (1) Corporation of Oldham (against alterations), (2) Trustees of Manchester, Hyde, and Mottram Turnpike Trust; Mirfield Gas, from Thornhill Local Board; Nelson Local Board, from Brierfield Local Board; Newcastle-upon-Tyne and Gateshead Gas, from (1) Corporation of Gateshead, (2) Corporation of Newcastle-upon-Tyne; Nottingham Corporation, from Nottingham Water-Works Company; Over Darwen Corporation, from James Bullingh and others (as trustees and beneficiaries under the will of Adam Bullingh, deceased); Pemberton Local Board, from Lancashire and Yorkshire Railway Company; Queenstown Gas, from Queenstown Town Commissioners; Rochester Corporation, from Humphrey Wickham; South Shields Gas, from (1) Corporation of Jarrow, (2) Whitburn Gas Company, Limited; Weardale and Shildon District Water, from George Jederton Leaton-Blenkinsopp.

Friday, Feb. 28.

Portsmouth Water Bill.—The Examiner reported that the further Standing Orders had been complied with.

Petitions against the following Bills were presented:—Aire and Calder Navigation, from Lancashire and Yorkshire Railway Company; Belfast Water, from Robert Murphy and Thomas Tighe Mecredy; Blackburn Improvement, from Daniel Thwaites; Blackpool Extension and Improvement, from (1) George Bolton, (2) Blackpool Pier Company; Dearne Valley Water, from Midland Railway Company; Gaslight and Coke Company, from Metropolitan Board of Works; Glasgow Corporation Water, from (1) John Bartholomew and Co. and others, (2) Owners and occupiers of factories on the River Clyde; Glossop Gas, from Corporation of Glossop; Lancaster Gas, from Corporation of Lancaster; Leeds Corporation, from Midland Railway Company; Liverpool Lighting, from Liverpool United Gaslight Company; Lower Thames Valley Main Sewerage Board, from (1) William Talfourd Salter, (2) Chelsea Water-Works Company, (3) Southwark and Vauxhall Water Company, (4) Frederick Harrison and Frederick Francis, (5) Grand Junction Water-Works Company; Manchester Corporation Water, from Corporation of Wigan (against alterations); Mirfield Gas, from Liversedge Local Board; Morecambe Gas, from (1) Midland Railway Company, (2) Poulton Bare and Torrisholme Local Board; Nelson Local Board, from (1) Smith Smith, (2) Richard Ridehalgh; Nottingham Corporation, from Midland Railway Company; Nottingham Water, from Midland Railway Company; Over Darwen Corporation, from (1) Thomas Hodgson and James Finch (as trustees under the will of James Hodgson, deceased), (2) Lancashire and Yorkshire Railway Company; Preston Gas, from Corporation of Preston; Rawmarsh Local Board, from (1) Corporation of Rotherham, (2) Manchester, Sheffield, and Lincolnshire Railway Company; Rochester Corporation, from (1) Company of Proprietors of the Lower Navigation of the River Medway, (2) Charles Gustavus Whittaker, (3) Wardens, &c., of Rochester Bridge, (4) Earl of Darnley; Rotherham Borough, from Manchester, Sheffield, and Lincolnshire Railway Company; Wisbech Gas, from Corporation of Wisbech; Wombwell Local Board, from Elsecar, Wentworth, and Hoyland Gas Company.

Mr. Shaw Lefevre gave notice that on the second reading of the Nottingham Corporation Bill, which is fixed for Monday, March 3, he should move—"That it be read a second time upon this day six months."

Saturday, March 1.

Petitions against the following Bills were presented:—Aire and Calder Navigation, from (1) The Postmaster-General, (2) North-Eastern Railway Company; Alliance and Dublin Consumers Gas, from the Postmaster-General; Arlecdon and Frizington Water, from London and North-Western and Furness Railway Companies; Belfast Water, from Corporation of Belfast; Birmingham Corporation Water, from Holders of Birmingham Corporation Water Annuities; Birmingham Gas, from Corporation of Birmingham; Blackburn Improvement, from (1) The Postmaster-General,

(2) Owners and occupiers of land and ratepayers of Little Harwood, (3) Major-Gen. R. J. Fielden, (4) Owners and ratepayers of Livesey, (5) Owners and ratepayers of Witton; Blackpool Extension and Improvement, from (1) The Postmaster-General, (2) Lancashire and Yorkshire and London and North-Western Railway Companies, (3) Richard Handley; Brighton and Hove Gas, from the Postmaster-General; Bromley Gas, from the Postmaster-General; Bury St. Edmund's Gas, from the Postmaster-General; Cardiff Corporation, from (1) Lord Windsor, (2) Lessees and occupiers and water consumers in Penarth, (3) Guardians of the Poor of the Cardiff Union and others; Crystal Palace District Gas, from the Postmaster-General; Dearne Valley Water, from Swinton Local Board; Derby Improvement, from (1) The Postmaster-General, (2) London and North-Western Railway Company, (3) Great Northern Railway Company; Glasgow Corporation Water, from (1) Caledonian Railway Company, (2) William Smith Dixon and others, (3) John Robertson and Co., Limited, (4) Clyde Navigation Trustees; Glossop Gas, from Hollingworth Local Board; Ilkley Gas, from the Postmaster-General; Imperial Continental Gas Association, from the Postmaster-General; Knutsford Light and Water, from the Postmaster-General; Lancaster Gas, from (1) The Postmaster-General, (2) London and North-Western Railway Company; Leicester Corporation, from (1) The Postmaster-General, (2) Members of the medical profession in Leicester; Liverpool Lighting, from (1) The Postmaster-General, (2) Corporation of Bootle-cum-Linacre, (3) Mersey Docks and Harbour Board; Lower Thames Valley Main Sewerage Board, from (1) John Henry Doyle and Anthony Norris, (2) Lambeth Water-Works Company, (3) Thomas Anthony Hufa Williams and Sir Wilford Brett, (4) Charles James Freake, (5) John Malcolm, (6) Charles Joseph Corbett, (7) Hannibal Speer, (8) East Molesey Local Board, (9) Owners of land and houses in East Molesey, West Molesey, Esher, and Thames Ditton, (10) Robert Few, (11) Owners, &c., of mansions, &c., and others in the parish of Walton-on-Thames and others, (12) Owners and ratepayers in Kingston-upon-Thames; Manchester Corporation Water, from (1) South Lancashire and Cheshire Coal Association and Colliery Owners (against alteration), (2) Duke of Bridgewater's and Earl of Ellesmere's Trustees (against alteration); Mirfield Gas, from (1) The Postmaster-General, (2) Calder and Kebble and Aire and Calder Navigation Companies, (3) Heckmondwike Gas Company; Morecambe Gas, from (1) The Postmaster-General, (2) London and North-Western Railway Company; Nelson Local Board, from Messrs. Towneley, Parker, Holden, and Briggs; Newcastle-upon-Tyne and Gateshead Gas, from the Postmaster-General; Nottingham Corporation, from (1) The Postmaster-General, (2) Great Northern Railway Company; Over Darwen Corporation, from (1) The Postmaster-General, (2) Corporation of Blackburn; Pemberton Local Board, from (1) Leeds and Liverpool Canal Company, (2) Duke of Bridgewater's Trustees, (3) Baron Gerard; Plymouth and Stonehouse Gas, from (1) The Postmaster-General, (2) Corporation of Plymouth and East Stonehouse Local Board; Portsmouth Water, from Francis George Foster; Preston Gas, from (1) The Postmaster-General, (2) London and North-Western Railway Company, (3) Walton-le-Dale Local Board of Health; Queenstown Gas, from the Postmaster-General; Rochester Corporation, from (1) Corporation of Maidstone and freighters and traders on the River Medway, (2) London, Chatham, and Dover Railway Company, (3) Owners, &c., of lands, &c., affected by the Bill, (4) South-Eastern Railway Company; Sleaford Water, from Great Northern Railway Company; South Shields Gas, from (1) The Postmaster-General; (2) North-Eastern Railway Company; Stourbridge Gas, from (1) The Postmaster-General; (2) Great Western Railway Company; Stratford-upon-Avon Corporation, from (1) Stratford-upon-Avon Gas Company, (2) The Postmaster-General; Tipton Local Board, from (1) The Postmaster-General, (2) London and North-Western Railway Company, (3) Corporation of Birmingham; Warrington Corporation, from (1) The Postmaster-General, (2) London and North-Western Railway Company, (3) Duke of Bridgewater's and Earl of Ellesmere's Trustees; Westgate and Birchington Gas and Water, from (1) Owners, &c., of houses and lands at or near, and consumers of gas in Westgate and Birchington, (2) Thanet Gas Company; Wisbech Gas, from the Postmaster-General; Wombwell Local Board, from the Postmaster-General.

KIRKBY LONSDALE GAS COMPANY.—The ordinary half-yearly meeting of this Company was held on Friday last, when the accounts which were presented showed a balance of £172 4s. 4d., which the Directors proposed to dispose of as follows:—To pay a dividend at the rate of 6 per cent. per annum, which would absorb £168, and leave the balance of £4 4s. 4d. to be carried forward to next year's accounts. "It will be observed," the report states, "that a large item in the expenditure has been for permanent improvements and additions to the works, which have been undertaken by the advice of Mr. Fleming, of Lancaster, and carried out under his able superintendence. The expenditure thus incurred having placed the works in a much more efficient state than they have hitherto been in, the Directors confidently anticipate that the alterations will prove advantageous both to Shareholders and to Consumers."

GRANTHAM GAS COMPANY.—The half-yearly meeting of this Company was held on Tuesday, the 11th ult.—Mr. J. F. Burbidge in the chair. The Directors report stated that owing to the increased consumption of gas, the price of which had been reduced to 3s. 9d. per 1000 feet, and good management on the part of the Company's Engineer, the undertaking continued to yield a satisfactory revenue. The works were reported to be in an efficient condition to meet present requirements. The Chairman and Manager had inspected the electric light, and gave it as their opinion that no injury to their property was likely to be incurred by the adoption of that system of lighting. The statement of accounts presented showed the capital account to be as follows:—Receipts: To amount of paid-up capital, in 1250 shares of £20 each, £25,000; ditto received on account of 250 new shares, £4870—total, £29,870. Disbursements: By expenditure of capital to Dec. 31, 1878, £28,711 6s. 2d.; balance, £1158 13s. 10d.—total, £29,870. The revenue account showed that the total receipts amounted to £8369 9s. 3d., including gas-rental, £3451 10s. 4d.; public lamps, £345 0s. 2d.; coke, £536 15s.; services and meters fixed, £132 12s. 9d. The disbursements, including dividends paid August, 1878, £3125; coals and carriage, £1277 14s. 1d.; maintenance of works, £164 16s. 6d.; salaries and wages, £461 7s. 3d.—leaving a balance in hand amounting to £2645 10s. 3d. The report was adopted, and the retiring Directors and Auditors were re-elected. In acknowledging a vote of thanks, the Chairman said he must take the opportunity of stating that he thought they were much more indebted to their Manager than to the Directors; and it was his wish to make this as public as he could, for he believed they had a very first-class man—one who not only understood his business, but who attended to it, which they did not always find to be the case. It was only due to Mr. Barratt to express that opinion. The Manager (Mr. Barratt) acknowledged the Chairman's observations, assuring the meeting that he endeavoured to give the most careful attention to his duties, and then left the result, with confidence, to the Directors, of whose assistance he was always sure.

Legal Intelligence.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

TUESDAY, FEB. 18.

(*Before the* MASTER OF THE ROLLS.)

WRAGG *v.* THE COMMERCIAL GAS COMPANY.

This case, which had already been before the Court upon motion (see JOURNAL for Jan. 28, p. 119), came on to-day to be heard upon the merits.

Mr. CHITTY, Q.C., Mr. H. MATHEW, and Mr. G. A. WATSON appeared for plaintiff; Sir HENRY JAMES, Q.C., Mr. MARTEN, Q.C., and Mr. ROMER for the defendants.

Mr. CHITTY, in opening the case, said that the sole issue which the Court had to try was one of nuisance or no nuisance. The plaintiff was lessee and occupier of the Ship and Dolphin public-house, being No. 134, New Gravel Lane, Wapping, and held the house for the residue of a term of 14 years, at a rent of £45. On the ground floor there was a bar-parlour and a public parlour, the latter running out towards a wall at the back, separating the defendants premises, which wall was 14 ft. 9 in high. On the top of the public parlour, which covers a part of the yard, there was a zinc flat, used for drying clothes, with a passage running along the side, having a door which was sometimes open, the result of which would be explained by the witnesses. On the first floor was a kitchen, with French windows opening towards the gas-works, and in front of that, on the same floor, was the best bed-room. On the second floor there was another bed-room. The defendants retort-house was 34 feet high, and there were three openings in it. It contained five retort-beds, each consisting of nine retorts, which were drawn every two hours each day in the week, Sunday included. The operation of drawing occupied about half an hour. The retorts having been drawn, the burning coke was raked into iron wheelbarrows, capable of containing between 1 cwt. and 2 cwt. of coke each. The contents were then thrown on to the ground, and left in heaps, pails of water being thrown upon them. That operation must, of course, cause an offensive smell, and be accompanied by steam and dust. It was scarcely necessary to have scientific evidence upon that. All the smoke, dust, and sulphurous vapour came to the back of the plaintiff's house. From this he had been suffering for some time; but in October, 1877, he had first noticed it. He then thought it would be temporary only, because until the new retort-house was built the defendants used to perform the slaking operation 230 feet off. As high walls intervened, the plaintiff suffered little. The defendants used then to purify the gas there, of which he complained, and that ceased. He wrote a letter to Sir James Hogg, complaining principally of the purifiers, and from time to time he went to various Local Authorities, who all told him he had gone to the wrong place. At last he went to his solicitors, and after a correspondence with the solicitors for the defendants, the present action was commenced. The plaintiff's business had suffered very considerably, and the affidavits on the other side suggested that he was affected by the general depression of trade only; but it would appear that customers declined to go to his house. He did not propose to give any detailed evidence as to damage; because, although, no doubt, the plaintiff had suffered, the chief thing he wanted was an injunction. It appeared from the affidavits that the main question would be whether the coke was brought out as "live" coke or "dead" coke. The quenching operation might, to some extent, be performed in the retort-house; but it was quite certain that in the ordinary course the greater part of it was done outside. It was admitted by Mr. Jones, the Chief Engineer of the defendants, that the object of pouring water on coke when it came out of the retorts was to prevent further combustion; so that it was clear that the coke was in a condition in which it would consume itself.

The following evidence was then called:—

Mr. *Thomas Wragg*, examined by Mr. MATHEW.

I am the plaintiff in this action, and occupy the Ship and Dolphin Tavern in New Gravel Lane, Shadwell. I went into possession in August, 1876, and paid £600 for the lease and £170 for the fixtures and fittings. The lease is the residue of a term of 14 years from 1872, and the rent is £45. My house is one of a row of houses on the west side of Gravel Lane, and faces to the east. At the back are the works of the Commercial Gas Company. The wall between my premises and the Gas Company's works is about 14 feet high. My house is a three-storey one, and behind it there is a public parlour, covered with a zinc roof, and lighted by a sky-light. Standing on that zinc roof, you can look over the wall into the defendants premises. On the first floor is a room, which is used as a kitchen, looking towards the defendants premises. On the floor above, there are two bed-rooms. When I went into possession there were three houses belonging to the defendants in the yard behind my house. Two of these houses were shortly afterwards pulled down, and the site made part of the yard. When I went into the premises none of the defendants coke was quenched in the yard behind my house. There was a retort-house there, but not in the same position as the present house. The quenching operations were then carried on in a yard in High Street, Wapping, facing the river. That was 200 or 300 yards from my house. There were buildings between the yard and my premises, which intercepted vapour that might otherwise have come to the house. While the quenching operation was being carried on in the High Street, I did not experience any inconvenience. The yard immediately at the back of my house was then used for the storeage of timber, iron pipes, sawdust, and other things used by the Company. About the middle of the summer of the year 1877, the Company began using the retort-house of which I complain. The nearest door way of that house is about 30 feet from my premises. When they first began to use the retort-house, the coke was taken to the old yard in High Street, Wapping. The retort-house was in full work when they began to bring the coke to the yard behind my house. That was the latter end of the summer of 1877. From that time down to the present they have constantly used the yard at the rear of my premises for the quenching operation. Standing on the zinc roof I have described, I am able to see the operation conducted. That goes on every two hours during the twenty-four, including Sunday. The coke is drawn out of the retort into large iron wheelbarrows, and is brought into the yard and tipped over in heaps. The defendants workmen then come with pails of water, and throw it over the coke. That operation lasts about half an hour during each two hours. Upon the average, from 12 to 20 barrows full of coke are brought out. When brought from the retort-house, the coke is generally red hot and flaming. Previous to the water being thrown upon the coke, there is a green smoke issuing from it. On the water being thrown upon it, a quantity of dust and steam, with a lot of smoke, is produced. When the atmosphere is heavy, that steam hangs about for a considerable time; and when the wind is in the direction of the back of my premises, and the windows are open, the vapours are carried into the house. When the water is first thrown on the coke, a great portion of the vapour produced is green; but it gradually becomes white. It has a very bad sulphurous smell. A large quantity of dust blows about, which finds its way into my house. I supply dinners to people in the neighbourhood. The customers are

served in the public parlour at the back of the house, and in front of the bar While people have been dining, and this quenching operation has been going on, I have noticed the effect in the bar, which was that you could see the vegetables were covered with dust like pepper, and the smell of sulphur was very strong. I have had complaints in consequence, and my customers have wanted me to change their dinners, as they had been spoilt. I called in a sergeant of police, and showed him the effects. I took him up to the zinc roof. Some of my customers have been in the habit of using the public parlour. I have noticed in that room, which is used as a club-room, the same effects when the skylight has been open. I have also had complaints from my customers as to that. Some of my customers have been in the habit of coming there on Friday evenings, as a sort of club, and whilst they have been there the vapours on several occasions have caused them great annoyance, of which they have complained, and a number have, in consequence, ceased to use my house. When those customers have complained, I have taken them, from time to time, up to the zinc roof, in order that they might see what was going on. Latterly, the business of my house has fallen off considerably, and I know that some of my former customers go elsewhere. In the early part of 1878, the Gas Company used purifiers near the back of my house. These were frequently cleansed, and the operation was very offensive. I wrote to Sir James Hogg about it in February, and was referred to the Board of Works for the Limehouse district. Soon after that, the purifiers were moved farther off. Later in the year, I complained to the District Board of this nuisance from quenching the coke. This was about July. I was referred to the St. George's Vestry. I applied to the Vestry on two occasions, and I was told I was out of court, because I did not live in that parish, and was referred back again to the Limehouse District Board. I went again to the Vestry, and the Chairman said he sympathized with me; but that was all the relief I obtained. I afterwards applied to Mr. De Rutzen, the Magistrate, and he advised me to consult a solicitor. I had an interview with a gentleman from the Gas Company—Mr. Jones—before going to the Magistrate. He said it would have been better if I had gone to him at first, instead of writing to Sir James Hogg; I told him I could never see any one at the works. He asked what I suggested. I told him I could not suggest anything, unless they could do all the work at High Street, Wapping. Mr. Jones said it was impossible to do it all there, and asked if I should like a high wall put up at the back of my house. I said that would block out what little light and air I then had. He asked what I wanted, and I told him he knew better than I did; and were I in the Company's place, and they in mine, they would make me suffer severely, or clear me out. He said I could not make them suffer severely, and to clear them out was impossible. He promised to do all he could to stop the nuisance; but nothing has been done to stop it. My wife and one servant live with me; my wife has been ill, on and off, for 18 months. She has been attended by Dr. Blackley, who came down to look at the house, and I took him on to the zinc roof over the back parlour. He advised that my wife should go away. She went away for a time, and came back better. When we first went into the house the zinc flat was used for drying linen; but since this quenching operation has been carried on we have been unable to do this. The clothes would be covered with fine dust, like pepper. We have been obliged to put the washing out in consequence.

Cross-examined by Sir H. JAMES: I went to the house on Aug. 22, 1876. Before that I had been managing a public-house in Old Gravel Lane, close to where I am now. This is not the first house I have had of my own. I have been a publican six years. During the year, 1876, I made no complaint of the gas-works except of the smell from the purifiers. I first complained of them as soon as I went there; the neighbourhood was in a turmoil about it. In 1877, I had to complain of the smell from the purifiers, and also of the gas lime being dropped from the carts into the road; it lay and steamed there all day. That was from the carts not being covered over. That also existed in 1876 and 1877. It has not continued until the present time. In 1877, I had no reason to complain of the slaking of the coke until near Christmas. I cannot say the exact date. During December and January the coke was piled up behind my house, and rolled over on my premises. The slaking commenced at the latter end of the summer of 1877. I am quite sure there was none of this nuisance in 1876 and the early part of 1877. It could not have occurred without my seeing it. At any rate, I suffered no inconvenience from it. It was a great nuisance when it commenced, and I attribute my wife's illness to it. She had suffered from bronchitis, and this smoke affected her throat, and made her much worse. The dust, and the abominable smell and steam, were the same as now. My attention was called to it in 1877, and down to the spring of 1878. [The witness here read the letter of Feb. 28, 1878, from himself to Sir J. Hogg.] In that letter I complained of the purifiers. They had nothing to do with the coke. The purifiers were only opened occasionally; the coke was quenched every two hours.

Sir H. JAMES: Why did you not complain of the coke to Sir James Hogg?

Witness: Because the other was the greater nuisance of the two then. My wife's illness had been aggravated by the coke before February, 1878. I had observed the dust on the clothes, &c., before that date. I had noticed the smell from the coke. It was difficult to tell which was the worst. I had seen the water thrown on the coke. I did not mention it to Sir James Hogg, because the other was the greater nuisance of the two. I thought if I mentioned too many things at once, I should get no redress. I wrote to the Limehouse District Board of Works. I think I complained to them of the coke. In the early part of 1878 I first complained of the coke being slaked. It was after the purifiers were removed that I complained of the coke. They were removed in the early part of 1878. I complained to the St. George's Vestry personally. The Rev. Harry Jones was Chairman. The purifiers were removed at that time. I never complained to Sir James Hogg about the coke. I never wrote to the Gas Company, but I had been there several times. I complained to Mr. Ward, a foreman. I saw him at the gates of the works. I cannot tell the date. From the summer of 1877 till August, 1878, the coke was being slaked daily—more in the winter than in the summer. I saw a bill, which was circulated in the neighbourhood, with my name upon it. I cannot tell the date; it was about the middle of the summer of 1878. [The learned Counsel read the handbill, which proposed the formation of a Committee, and the signing of a memorial on the subject, which lay, amongst other places, at the plaintiff's house.] The memorial did not lie at my house. A Mr. Cook had the bill printed. I did not object to it. I saw Mr. Jones in August, 1878. He said it would be very injurious to the neighbourhood if the works were shut up. He may have asked me how I should like it if the gas-men left my house. I did not say it would make no difference, because they had already left. I said it would make little difference in the neighbourhood, as the majority of them lived away. Men had not left my house because I complained of the gas-works. I went to the solicitors of Messrs. Reid, the brewers, and told them of the nuisance I experienced, as I have already described, and as it occurs. The letter of Sept. 16, 1878, was the first written complaint from me personally with regard to the coke. I should think they had received hundreds of letters of complaint from others. I did not tell Mr. Jones, or intimate to him that I wanted money from the Company. I say I am entitled to compensation for the loss of my business. My neighbours have benefited by my loss of trade. I ascribe a great deal of my loss of business to the nusiance. I do not know of any other public-house which has been affected by the nuisance. There is no other so close to it as mine. [Some photographs of the premises were shown to the witness, and he said they were meant for his house, but there was an omission.] The coke is wheeled out in iron barrows. The men draw it. They do not push it, but always turn their backs to it. It comes out red hot—sometimes white hot. It has seldom come out black—never, unless I have had some gentlemen on my premises looking at it; then they keep it in the retort-house, and throw water over it first. I believe they throw one pailful over it always before they bring it out, to prevent the men being roasted. Up to September I say the coke was brought out red hot and flaming. I believe there had been then one pailful of water thrown on it. I could feel the heat from it in my house, when it was piled against my wall. The men bring out the barrows one after the other, and when from 12 to 20 have been brought out, water is thrown over the coke, about two pails on each heap. Each barrow-load forms one heap. One man is kept to throw the water over it. If it is very hot when the water is thrown upon it, a very offensive green steam comes from it first. It has been seen by others, especially at night-time and on Sundays.

The MASTER of the ROLLS remarked that these questions did not bear on the issue.

Cross-examination continued: I began to smell the coke in the summer of 1877. There is a chimney at the back of my premises, which carries off the smoke from the parlour. There are no other chimneys except what are as high as the houses. There are fish-curers, braziers, coal and coke dealers, and a pork butcher, in my neighbourhood. I have not lost flesh myself, but I have vomited in the morning, which never occurred to me before I went to this house.

Re-examined by Mr. CHITTY: I attribute this sickness to the smell. I do not drink much overnight. I was told at the gas-works that the nuisance from slaking the coke would be only temporary. That was why I did not complain earlier. I went to the works on several occasions to complain, but could never find any one. When I complained to Mr. Jones I mentioned the dust, steam, and vapour.

Mr. *Alfred Ballard*, examined by Mr. CHITTY.

I am a printer, and a vestryman of St. George's-in-the-East. I live in Cannon Street Road, about half a mile from the premises in question. I have frequented the plaintiff's house occasionally. I attended a club which met there on Friday evenings. I have seen the coke-quenching process once, when I was taken on the leads. Mr. Wragg asked me and several more to go upstairs. I went, and saw five or six heaps of burning coke. Men were wheeling it out, and others were throwing cold water upon it—it was red hot. We were enveloped in smoke and steam, and there was a fearful stench. We could not see any dust for the steam and smoke. I did not stay there long. The men continued to bring the coke out. I cannot remember having smelt anything on that particular occasion, but on many occasions I have. I have noticed it come on when I have been in the house. I have asked plaintiff to close the ventilator in the club-room, on account of the smell. I have also noticed the smell in the bar. I have heard numerous complaints from other customers. It has been brought before the Vestry times out of number.

Cross-examined by Sir H. JAMES: I have known the plaintiff for some years. At one time I printed for the Gas Company. Complaints have frequently been made; this has been a grievance for many years. I do not particularize the coke or the purifiers; I think the latter have been the chief cause. I have noticed the smell for nearly two years; but I cannot be certain of the time—over one year, certainly. I am not versed in what these smells come from. I think it was the 23rd of October when I went upon the leads. The smell was as if a tea-kettle had overturned on the fire.

Mr. *Walter Ennever*, examined by Mr. WATSON.

I am a wheelwright, and live in the neighbourhood of plaintiff's house. I have used the house for some years. I have often noticed a bad smell coming from the gas-works. [This witness generally gave similar evidence to that of the plaintiff and Mr. Ballard.] When the steam came up I went away—I could not stand it. Many customers left the house in consequence of the smell from the gas-works. I have frequently kept away myself.

Witness was cross-examined by Sir H. JAMES, but nothing material was elicited, except that he had smelt a bad smell ever since the plaintiff went to the house, but not nearly so bad as during the last 18 months.

Re-examined: I have seen the adjoining premises lighted up, as I thought, by the hot coke.

Mr. *George Hurst*, examined by Mr. MATHEW.

I carry on business as an oil and colourman, at 30, New Gravel Lane, next door but one to the plaintiff. I have been there 22 years next March. Coke has only been slaked in the yard behind my house since the latter end of the summer of 1877; before that time it was done at High Street, Wapping. I have been in the habit of visiting plaintiff's house from time to time. Since the slaking operation has been going on, the smell has been very bad in my house, and we have been obliged to keep the doors and windows shut when the wind has been in that direction. In the summer time I have had to leave my bed and go into the front room to get away from the smell. The operation goes on about every two hours, Sundays and weekdays. I have perceived the same smell and smoke in plaintiff's house, and have seen the slaking operation from his leads. The coke has been in a red-hot, blazing condition, when brought out; at night it has illuminated the yard. When the water has been thrown on it I have noticed the steam, dust, and smell arising. I have often heard plaintiff's customers complain, and travellers who have come to my house have also complained. About the middle of the summer of 1878, Mr. Jones sent for me, and I saw him. I had not previously complained to him. He said, "You are not a troublesome neighbour," and asked me if I had any cause of complaint. I said I complained of the steam from the coke, and the bad smell of sulphur. He asked what I could suggest. I said he would know better than I, but I would suggest he should cool the coke in the front of the yard. He said it was impossible to take the whole of the coke to the front. I asked why he now brought it to the back, which they did not previously do. He said he would alter it as soon as he could. Last summer he stopped me in the street, and said he would put up a screen about 14 or 16 feet high. He has not done anything of the kind. I have noticed that fewer people go to plaintiff's house now than formerly.

Cross-examined by Sir H. JAMES: I first had cause to complain of the gas-works about 18 months ago; I had reason to complain of the purifiers, but never did. The nuisance from the purifiers ceased about twelve months ago, and the coke nuisance took its place. The purifiers gave off a putrid smell; this is a sulphurous smell. I have suffered in health, and have lost flesh. I did not smell the coke at the same time as the purifiers. The change was made a little more than a twelvemonth ago. Mr. Jones sent to me after the printed bill was circulated, on which my name appeared. My name was put on it without my authority. I had made no complaint. I did not have a memorial for signature in my shop.

By the MASTER of the ROLLS: I supply goods to the Gas Company. They deal with me now.

Mr. *John Spooner*, examined by Mr. CHITTY.

I reside at 31, Blakesley Street, Commercial Road, and am a retired ship-chandler. I have some freehold houses, 30 and 32, New Gravel Lane. I have often called there, and at the plaintiff's house. I have frequently seen the operation of slaking the coke. I heard what the plaintiff said, and I agree with him to some extent. I saw the coke brought out red hot, and delivered in the yard in barrows fall; a man followed with water, and threw it over the coke. [The witness generally corroborated the previous evidence.]

Cross-examined by Sir H. JAMES: I purchased these houses five or six years ago, and they have never been vacant. I do not know of a house being vacant in the immediate neighbourhood. I have only been once on the leads at the back of plaintiff's house. I have known of the bad smell at times from the purifiers for many years. It was after I knew of the smell that I bought the houses.

Mr. *Joseph Johnson*, examined by Mr. WATSON.

I am an engineer, living in the Commercial Road, and am an occasional customer of the plaintiff's. I noticed and complained of the smell when I first went there. I have been on the leads on two or three occasions. I have not the dates, but I think twice last year and once this. I saw about 15 barrows of coke, red hot, smoking, and some of them flaming. One or two buckets of water were thrown on each heap; some required more than others. The result was the production of large volumes of steam and smoke, and a nasty smell. I have smelt the same smell inside the plaintiff's house. Two of my friends have objected to go to the house on account of it.

Cross-examined by Sir H. JAMES: I have not the dates, but it was some time last year.

Mr. *August Wenzell*, examined by Mr. MATHEW.

I carry on business as a baker, at 43, New Gravel Lane, exactly opposite the plaintiff's house. I went there in March, 1878. I have been annoyed by the vapour and smell from the gas-works. All the time I have been there, when the wind is in that direction, I have seen the vapour coming over and through the plaintiff's house. I have seen it coming out at the front door. I have noticed dust and blacks coming into my shop door from the gas-works, over the plaintiff's house. The vapour turns the brass-work and scales in my shop black. I have been on the leads of plaintiff's house, and seen the red-hot coke brought out and water thrown on it. I have seen it frequently; it was done close to the wall where I have been standing. The colour of the vapour has been green when the water was thrown on it; the smell was sulphurous, and very strong. I have been in the habit of going to plaintiff's house occasionally, and have heard complaints there about the smell.

Cross-examined by Sir H. JAMES: My shop had been a baker's before, and I bought the goodwill. I made some inquiries about the business, and visited the neighbourhood, but not very often. I smelt the bad smell, but did not know it was continuous. The vapour comes over the plaintiff's house in a black dust, and through the door as well. I have never noticed any one else's door, because plaintiff's is just opposite mine.

Mr. *Thomas James Cook*, examined by Mr. CHITTY.

I reside at 29, Pruesome Street, and am a retired gunmaker. I have been several times in the plaintiff's house, and have witnessed the operation of slaking the coke three times from the zinc flat—once in June, 1878, once in January this year, and the other occasion between the two. On the first occasion they were bringing out coke all in a flame. I did not stop many minutes. I saw two men bring out barrows of coke, water was thrown on it, and steam of a yellow colour arose, and a strong sulphurous smell; there was a great deal of dust flying about as well. I did not notice which way the wind was. On the second occasion I saw four or five barrows brought out; the coke was all aflame, and the same sulphurous steam and dust arose. In January it was similar, but not quite so bad as on the previous occasions. I have noticed the smell inside the house. On one occasion particularly the steam and smell coming through the house was enough to suffocate one.

Cross-examined by Sir H. JAMES: I made a complaint against the Gas Company on account of their purifiers. I had the handbills printed which have been produced. I put down Wragg's house as a place where signatures could be put to a memorial. It was suggested one day when we were in the house; I did not ask leave to put down his name and Hurst's. I live in Pruesome Street because I have some property there. I cannot say when the bill was published; it was after I had been on plaintiff's leads. He did not say he wanted me to give evidence. The nuisance I complained of still exists. The Medical Officer of the Vestry (Dr. Wright) said it was not a nuisance, but I have had to pay a doctor's bill as a consequence of it.

Mr. CHITTY said he had some other witnesses of the same class, but as there were several scientific gentlemen who wished to leave, he would interpose them.

Dr. *James Galley Blackley*, examined by Mr. MATHEW.

I reside in Guilford Street, Russell Square. I am a Bachelor of Medicine, and a Member of the Royal College of Surgeons. I was consulted by plaintiff's wife in June last year, and attended her till August. She complained of spitting of blood and swelling of the feet and legs. She explained that she lived near gas-works, and I went down to see the position of the house, and decide whether it was prudent for her to remain there. On Aug. 21, 1878, I went there, and was taken on to the leads to see the slaking operation. I saw some barrows of coke brought out of the retort-house and tilted in the yard; the coke was glowing.

By the MASTER of the ROLLS: I mean by "glowing," red hot.

Examination continued: I saw water thrown on it, and a considerable vapour arose. The wind was then blowing away from the plaintiff's house. I was particularly anxious to ascertain if dust came from the operation, but the wind being away, no dust came to where I was, and the steam would have concealed it if it had been there. I exposed blue litmus paper and lead paper, to see if sulphur existed. The blue litmus turned red in about 10 minutes. The lead paper did not change during the 15 minutes I stayed. The change in the litmus paper indicated free acid in the air, which was what I expected. I formed an opinion that sulphuretted hydrogen would in all probability be given off from glowing coke when water was thrown on it. I advised Mrs. Wragg to go away for some time. I saw her again on Feb. 5 last. She was considerably better in health; the blood-spitting had ceased and the swelling diminished.

Cross-examined by Sir H. JAMES: I have not made chemistry a special study since I began practice; I did as a student. I have been eight years in practice. I attended Mrs. Wragg in 1877 at the London Homœopathic Hospital, to which I am attached. She was then suffering from stricture of the rectum. She had very much recovered from her previous ailment when I saw her in June. I attribute the blood-spitting to local engorgement of the blood-vessels of the lungs, brought on by the dust she was inhaling. I cannot say she had not a tendency to it; but, if so, it was aggravated by the dust. I have seen many cases of blood-spitting from inhaling dust, especially in Lancashire. Her condition might arise from ordinary phthisis. She was suffering from inflammation and consolidation of the lungs. If this arose from dust, I should expect the weakest to suffer first. I attribute the swelling of the feet to obstruction of the circulation of the blood through the lungs, and that may have proceeded from inhaling the dust, or from more natural causes. I recommended her to go into the country. Change of air is a remedy whether you are inhaling dust from coke or not. If she had been suffering from natural causes, I should have recommended some definite place; but I thought the dust affected her, and that if she went anywhere away from it she would be better. She went to Lynn, in Norfolk, and came back better. She returned before Christmas, but I did not see her before Feb. 5. As I have only seen her once since her return, I cannot say whether there has been any recurrence of her symptoms. There is still some consolidation in one lung. I cannot tell whether that arises from what took place before she went away. There is a little swelling, which I should expect from the old illness. The lead paper was not at all affected; a small quantity of sulphuretted hydrogen affects it.

By Mr. CHITTY: In my opinion the blood-spitting was caused by inhaling the dust.

By Sir H. JAMES: I did not notice any disagreeable smell, except when the vapour rolled towards the house. At the moment when the water was thrown on the coke, large volumes of vapour arose, and a little mechanically came towards the house; but as soon as the wind had power to act on it, it was blown away. I smelt it at the first; but it was afterwards that I exposed the test-papers. I should have expected the test-papers to have been affected if exposed at that moment. This would be so to whatever extent the sulphur had been extracted in the retort. If the coke were burned long enough, there would be no sulphur left. It would not pay the Gas Company to do that; there is always some sulphur left in the coke. A mere trace would not be injurious to health. Coal, as ordinarily burned, would retain so much sulphur as to be detrimental to health when water was thrown on it. I do not find great mortality amongst the men employed in gas-works.

Further re-examined: I agree that the products from the coke when quenched, greatly depend on its temperature at the time the water is thrown on it. If the coke is red hot, the water would be decomposed, and the hydrogen would unite with the sulphur of the coke, and form sulphuretted hydrogen.

By the MASTER of the ROLLS: I have never attended any gas-works *employés* as a body. I have seen many as a student in Manchester. Their health was below the average. They are not robust; but there is no definite ailment you can attribute to their employment. Some suffer from lung disease. On the average, I should say they do not suffer more than other workmen—not so much as in some employments. I have observed them at work. I cannot say whether they hold their breath when the vapour is rising.

Dr. *Theophilus Redwood*, examined by Mr. CHITTY.

I have been for 35 years Professor of Chemistry to the Pharmaceutical Society, am a Fellow of the Chemical Society, and a Member of the Institute of Chemistry. I have been many years acquainted with gas operations. I have been twice to the Ship and Dolphin, both times in December last. I went on the zinc flat, and saw the barrows coming out. I saw the incandescent coke brought out in the iron barrows. I mean by "incandescent," red hot for the greater part, in the condition in which coke is usually brought out from gas-retorts. The coke was tipped in the yard, and drenched with water. I think there were six to eight barrows, each holding about a sack of coke, brought out on both occasions. Each barrow-load was thrown in a separate heap. The men were pushing the barrows. Usually a pailful of water was thrown on each barrowful. The result was a large volume of steam. If the coke were at a red heat, there would, of course, be other gases. I cannot say, from my own observation, what the gases were. I can only say that steam arose. The wind was blowing from me on both occasions. The heaps were about 15 or 20 yards from the wall—some at a greater distance; they were brought out from two doors. The vapour was of the usual colour of vapour of water, somewhat intensified by smoke. The coke was smoking more or less before the water was thrown upon it. I should not say it was green; it was rather of a yellowish tinge. I did not notice any smell that I could ascribe to the vapour from the coke. There was the usual smell which pervades the purlieus of gas-works; I should not call it offensive. I should prefer not to live in it; but I am very often in it. The result of throwing water on coke is this: When hot from the retort-house, the coke has sulphur in it, forming, by combustion with the air, sulphurous acid. At that period there would be, and I noticed that there was, smoke issuing from the coke, which would consist of the foul gas produced in gas-making. That foul gas would contain the vapour of gas tar and of sulphide of ammonium, and other gases of a noxious nature, which are removed from gas in the process of purification, a portion of which remains in the coke as it is removed from the retorts. Sulphuretted hydrogen would be amongst the number. That is the general result, varying according to circumstances. Sometimes the coal is brought out before it is completely carbonized, and then there would be more of these foul gases than where the process had been completed. If the wind had been blowing towards the house on that occasion, I should say, from my experience under similar conditions, that there would have been a greater quantity of sulphurous acid than sulphuretted hydrogen; but if the coke was a bright red, there was more of the latter, in consequence of the oxidation of the sulphur contained in the coke. In my opinion, the quantity of gas given off by coke burned properly in gas-making is injurious to health to a certain extent; but the amount which would be deleterious to health is rather a medical question. The sulphurous acid can always be perceived; the sulphuretted hydrogen not so readily, because the atmosphere surrounding gas-works is loaded with gases of a similar nature. A small quantity of sulphuretted hydrogen mixed with other gases is not very perceptible. A pint bottle might be discharged in this Court without being perceived. In my opinion, the inconvenience is rather ascribable to the steam, dust, and sulphurous acid than to sulphuretted hydrogen.

By the MASTER of the ROLLS: Sulphuretted hydrogen is not the worst smell; it is the worst of these smells.

Examination continued: Ordinary people object to sulphurous acid. I have seen this operation performed frequently. There is always a gush of aqueous vapour, carrying with it a quantity of fine particles of dust in the coke. I have had practical evidence of the dust, in my eyes and hair, when standing near. The quantity of dust given off would be sufficient to produce inconvenience to a person five yards off, if the wind were in that direction. The sulphurous acid is also enough to cause inconvenience at a much greater distance. Those who are constantly in it appear to get accustomed to it.

TUESDAY, FEB. 25.

Rev. *Harry Jones*, examined by Mr. MATHEW.

I reside at the rectory, in Cannon Street Road, St. George's-in-the-East, and have been rector of the parish for the last five years. I remember the plaintiff in this action attending at the Vestry on one or two occasions, and complaining of the smell from the gas-works close to his house. The answer I gave him was that he did not live in the parish. He lived in the parish of Shadwell, and was therefore just beyond our jurisdiction.

The plaintiff called upon me a week or two ago, and asked me if I would go to his house, and see whether I could detect any smell. I went, and was taken on to the zinc roof at the back of the house. At that visit I saw two or three barrow-loads of coke being cooled, by water being thrown upon them. The wind was blowing from right to left, so that the smoke and steam went in the latter direction. I perceived some smell—not much; it was not agreeable. I had a message later on in the afternoon, asking me if I would call again, and I then saw three or four barrow-loads of coke brought out. They were emptied about 30 yards from the door of the retort-house. The coke was red hot. I saw them tilted up, and water thrown over the coke. The result was that, as the wind was blowing obliquely towards me, some of the smell came to me very distinctly as I stood on the leads. It was a sickening smell—a putrid smell.

Cross-examined by Mr. MARTEN: I have not had particular experience of gas-works, but I have been in several, and have been very keen in the matter of nuisances, on sanitary grounds. Some of the coke brought out was red hot. I cannot say as to the whole; but some of it was intensely red hot—brilliantly red hot—it lit up a portion of the yard. There was a yellowish vapour from it. I hardly know how long it took for the steam to go off. When they had been throwing water on it for some little time I left; but it went on steaming for some time. Inquiry was not made at the Vestry by the Medical Officer, but the Vestry Clerk was asked as to whether or not it really lay within the borders of the parish, and he said, "No; it lies beyond our jurisdiction." I suggested that two or three members of the Vestry should accompany Mr. Cook to the works, but his complaint was a distinct one altogether.

Mr. MATHEW: Did he state what his complaint was?

Witness: His complaint was that the coke was piled up against his wall, that it was brought out of the retort-houses red hot, and that when the water was thrown on it a certain amount of dust was produced, and this and the fumes entered his house. There was a complaint from Mr. Cook, but Mr. Wragg's was a separate matter. I had never been to the plaintiff's house before.

Dr. *Redwood* recalled, and further examined by Mr. CHITTY.

Mr. CHITTY: Just look at that board; do you say that some part of it is white at the top?

Witness: I say that some part of that board is white at the top, and the rest is not white in colour. As a chemist, in my opinion, sulphuretted hydrogen or sulphide of ammonium would be likely to produce that difference of colour. I am assuming, of course, that the board was white all over. That is the effect which sulphuretted hydrogen produces on white lead—a bluish black colour.

Mr. MARTEN: I do not know what that board is.

Mr. CHITTY: It comes from Mr. Hurst, who is the tenant of No. 30, a few doors away from plaintiff.

Cross-examined by Mr. MARTEN: In my judgment, to produce that appearance by the action of sulphuretted hydrogen or sulphide of ammonium, it would depend entirely upon the strength of the gas—that is to say, whether it were pure or whether it were diluted. If it were pure, the effect would be produced in two or three minutes; but if it were much diluted, some time might be required to bring about the effect. In my judgment, it would be produced by either of those substances. I cannot form any judgment as to the way in which it would be produced. The effect would be the same in either case. For the most part, the state of the coke when it goes out in the barrows is red hot. I have used the word "incandescent" in the sense of the coke being red hot; not as a white heat. Of course, there are various degrees of heat, indicated by dull red, bright red, cherry red; white heat being the highest temperature. Some of the pieces of coke, when tipped up, were certainly not visibly red hot. They were black, and then there were various degrees of heat, indicated by the colour. Some of them I should represent as being at a bright red heat—none of them, certainly, at a white heat. That would be the temperature, or approaching that, at which the coke would be when drawn out of the retort in the first instance.

The MASTER of the ROLLS: What was the bulk—how would you describe the bulk of it?

Witness: Well, I should describe the bulk of it as being of a good heat; a cherry-red heat, I think, would fairly represent the bulk of the contents of the barrows.

Cross-examination continued: Some was black, most certainly. I cannot give you any idea what proportion you would find in the bulk, because the barrows were not all in precisely the same condition. Taking the average, I should think perhaps it would be one-fourth or one-third of the whole. As to the formation of sulphuretted hydrogen in the gas, that is given off from the coke as it comes from the retort-house; it is contained in the foul gas, which is then liberated, and there is a certain proportion, dependent greatly upon the temperature of the coke when the water is thrown over it, which is produced in the process of slaking or quenching. When water comes into contact with the coke at a bright red heat, seeing that there is a certain amount of sulphur there, some of the sulphur comes into combination with the hydrogen of the water, and forms sulphuretted hydrogen, while the hydrogen combines with the carbon of the coke at the same time. But I do not say that the quantity produced in that way is a great quantity, and I consider that there is a larger amount of sulphurous acid—that is, a very sensible quantity. As to sulphuretted hydrogen, I say there is a trace, certainly. I never accurately determined the quantity; I believe that sometimes it would be more than a trace. Sulphuretted hydrogen would be produced from red-hot coal, if it were at a bright red heat—not at a dull red heat. I would not say that, at the heat at which I saw the bulk of the coke, it was sufficient to decompose the water, and produce sulphuretted hydrogen. I would not say that of the bulk of it, certainly—that is to say, of the greater part of it.

The MASTER of the ROLLS: It would produce some—you say not much?

Witness: There would be sulphuretted hydrogen, but not much.

Mr. MARTEN: Are you prepared to say that what you have described as a bright red heat would have decomposed water under any circumstances?

Witness: Certainly. It is a method by which water is constantly decomposed for the purposes of the production of hydrogen gas. Lead paper is a test to detect sulphuretted hydrogen. Sulphurous acid would be detected by litmus paper. If you adopted the most efficient means of detecting sulphuretted hydrogen, it would show; but not merely holding a bit of litmus paper in the atmosphere—that would not be sufficient. If you had some of the atmosphere shut up in a bottle, and kept it in contact with the paper for many hours, then, possibly, you might obtain a slight indication, even when there was only a small quantity of sulphuretted hydrogen present; otherwise you would not. As to the dust, I have used the term "dust" as indicating small particles of coke.

The MASTER of the ROLLS: Well, that is dust; dust is not confined to any one material.

Witness: Possibly, my lord, some persons might say there was water and there was steam, which would moisten these small particles, and dust is looked upon as dry, solid particles.

Cross-examination continued: I should call it a dusty operation. The operations of a coke-yard are altogether extremely dusty, and the manipulation of the coke—the shovelling of it up into large heaps—causes a considerable quantity of dust to be thrown up into the atmosphere, which the wind would carry some distance.

The MASTER of the ROLLS: You say that in windy weather it causes a great quantity of dust?

Witness: Yes. In any yard, coke is really a very dusty material. The cooling of the coke is distinguished from the slaking by pouring water over it. Every addition of water to the coke causes a gush of steam, which rises, taking with it a considerable quantity of dust, which would then be carried off by the wind. When I was at plaintiff's house, I should think the steam blew away in a minute or two. It would depend, of course, very much upon the strength of the wind, and the state of the atmosphere. Sometimes steam is immediately dissolved by diffusion in the atmosphere, and at other times it will hang about for a great length of time. That depends upon the previous dryness or moisture of the air. It would not necessarily be so in foggy weather, but weather in which the air is fully, or nearly fully charged with moisture already, and then it is unable to take any more by diffusion through it. I did not perceive any smell, that I could ascribe to the coke, that was brought out in the slaking, because the wind was in the opposite direction.

Mr. *Thomas W. Keates*, examined by Mr. MATHEWS.

I am Consulting Chemist to the Metropolitan Board of Works, and Superintending Gas Examiner to the Metropolis. I visited the plaintiff's premises last Saturday week, and I then went on to the zinc roof for the purpose of seeing what was going on. I think my presence was perceived by the people in the yard. While there, some barrow-loads of coke were brought out; it had been thoroughly quenched beforehand, and was quite black and steamless. I did not see any more water thrown upon it. I saw the position of the retort-house, and I noticed that some coke was piled against the plaintiff's wall. Assuming barrow-loads of coke to be brought out red hot and quenched close to the plaintiff's wall, the wind being in the direction of his premises, the nuisance must be very great, as the steam, dust, and ashes would enter the house. I noticed that the steam rose to a considerable height, and carried with it a very peculiar smell. The chief cause of the nuisance would be occasioned by the steam and dust. If the coke were brought out red hot, and water were thrown upon it, supposing the heat to be great enough, sulphuretted hydrogen would be produced, and the result would be very disagreeable to the immediate neighbourhood. I have never seen coke quenched in a retort-house; the men are anxious to get it out as quickly as possible. If there are vaults below, the coke is quenched in those vaults. Dust is a necessary consequence of pouring hot water upon coke, and the dust is of such a character as can be readily carried by the wind. In my judgment, it would be easy to adopt such precautions as would remove the evil complained of. The place in which the quenching is done might be enclosed, and the nuisance abated, if precautions were taken in performing the operation. The City of London Gas Company, many years ago succeeded in stopping the nuisance, they being watched very closely by the residents in the Temple. The dust could be prevented from entering the plaintiff's house by the erection of a screen in continuation of the retort-house.

Cross-examined by Mr. MARTEN: The wind was blowing north when I was there. It was not a high wind, but a moderate one. Ordinarily speaking, quenching coke at a red heat would not do more than create steam, but I have seen water thrown on a coke fire, and the lead paper immediately blackened. It is entirely a question of degree, at what heat coke will decompose water so as to give off sulphuretted hydrogen. If the coke were allowed to remain for a short time to cool a little, sulphuretted hydrogen would not be produced.

Mr. *John Fitzgerald*, examined by Mr. WATSON.

I am an auctioneer, residing at 151, Gray's Inn Road, and have had large experience in valuing property. A public-house is valued by the takings. The result of my inspection of plaintiff's books is that there has been a falling off lately of £20 per month. Upon one occasion, when I visited the house, I saw the Gas Company's men bring red-hot coke out in barrows; water was then thrown upon the coke, and immediately steam was given off, as well as a very obnoxious smell. I did not notice any dust. I attribute the falling off in the plaintiff's trade to people not frequenting the house in consequence of the nuisance.

Cross-examined by Mr. MARTEN: The trade would fall off if persons did not frequent the house from any other cause. I have not frequently visited the house.

[Witness was then taken through the returns per month, to show that the average decrease was not so much as stated, but he still maintained that there had been a falling off.]

Sergeant *Charles James Barton*, examined by Mr. CHITTY.

I am a police-sergeant of the K division. I recollect, when passing the plaintiff's house one day in July last year, being called in about a complaint made by some men at the bar. I went inside, and saw three men sitting opposite the bar with their dinners before them; they were complaining about the blacks and smuts that had fallen on their food. I placed my finger round the edge of one of the plates, and my finger became quite dirty. I noticed that the blacks were flying about the room, and there was a smell as if water had been thrown on the fire. The plaintiff offered to show me where the blacks came from, and I went with him on to the zinc flat. From there I saw the Company's men wheeling barrows filled with red-hot coke into the yard, and tilting the barrows at the rear of the plaintiff's premises. I remained for some seven or eight minutes. When the barrows were emptied, water was thrown on the coke, and a quantity of smuts and steam arose. The wind was in the west, and it blew right through the plaintiff's premises. Whilst I stood there, my coat and helmet became covered with these small blacks.

Cross-examined by Mr. MARTEN: I noticed the smell as soon as I entered the house. The smuts were small, and not so soft as soot; they were more like pepper.

Mr. *Hurst* recalled, and examined by Mr. MATHEW.

I live in the neighbourhood of the plaintiff's house. The board now produced was taken from the side of the conservatory at the back of my premises. It was painted white in October last, and in a few weeks it became discoloured.

Cross-examined by Mr. MARTEN: There is a chimney leading from the copper flue at the back of my premises; but the copper is only lighted once a week.

Mr. *A. Arrowsmith*, examined by Mr. WATSON.

I am a surveyor, residing at Brixton. I made the model of the premises in question, and to do so attended at the plaintiff's house on four occasions. On three of these occasions I went on to the zinc roof. I did not go upon the defendants premises. I saw the coke brought out red hot, and water thrown upon it, when a cloud of steam immediately arose. On the occasion of each of my visits the wind was from the north and east. There was an abominable smell; I cannot describe it in any other way.

Cross-examined by Mr. MARTEN: I saw the quenching going on; it lasted about a quarter of an hour.

Mr. CHITTY said he had intended to call Mrs. Wragg, but she was too unwell to attend. If it was desired, he would put the plaintiff into the box to prove that fact.

Mr. MARTEN said he did not desire that to be done.

Mr. CHITTY said he had several other witnesses, and if his friend desired to cross-examine them they should be called.

Mr. MARTEN replied that his learned friend must take his own course about calling further witnesses.

The MASTER of the ROLLS did not think it worth while to have any farther witnesses.

Mr. CHITTY: Then, my lord, that is our case.

Mr. MARTEN then proceeded to call witness on behalf of the defendants.

Mr. *Harry Edward Jones*, examined by Mr. MARTEN.

I am one of the Engineers of the defendant Company, a member of the Institution of Civil Engineers, and also of the Institute of Mechanical Engineers. I have been in practice as an Engineer for the last 18 years, and have during the whole of that period been connected with gas companies. I am Consulting Engineer for the Thanet Gas Company, the Watford Gas Company, and the Epsom Gas Company, and I have visited many gas-works in England, Ireland, and abroad. I am well acquainted with the process of the manufacture of gas. I manage the defendants works at Stepney, Poplar, and Wapping. The defendant Company acquired the gas-works at Wapping by amalgamation, at Christmas, 1875, they having previously belonged to the Ratcliff Gas Company. I was the only Engineer of the Ratcliff Gas Company, and had management of their works. About 140 or 150 men are employed at the works. The plan now produced shows the position in which the coke is thrown in the yard after the gas has been extracted from it, and also the position of the plaintiff's house. The gas is extracted by distillation in retorts, and the operation is carried on for about six hours, until the whole of the gas is exhausted. The coke is then drawn from the retorts, partially slaked in the retort-house, and then wheeled out into an adjoining place in the yard, where it is entirely extinguished. There is no smoke, because the coke has not been in combustion, it having been shut up in the retorts. Being at a high temperature, an exceedingly slow combustion sets in, and there is practically no gas issuing from the coke when drawn from the retort. The effect of throwing water on the coke in the retort-house is to cause a white cloud of pure vapour to arise; and when water is thrown on it in the yard, the steam is entirely harmless. I have never hesitated for a moment to walk through it, and I should not have any objection to remain in it for half an hour, if necessary. There is absolutely no sulphuretted hydrogen, and there could not be any, in the steam without my being aware of it, I having been engaged in this business all my life. There are no other gases evolved. Since this case has been going on, I, in company with different chemists who have visited the place, have tested for gases, although, for my own part, I must say it was a work of supererogation, knowing that none would be found, and the tests which we used failed to detect the presence of any gases. I do not mean to say there is no dust in gas-works; but in walking through the steam I never had any dust upon my clothes that I was able to discover. In the process of slaking coke, no substances injurious to health are given off. The old retort-house contains 17 beds of retorts, each bed containing 7 retorts, 20 feet long. Each bed is heated by a separate furnace. The new retort-house contains 3 beds of retorts, each bed containing 9 retorts, and they were in constant use from the winter of 1876 until the summer of 1877. In the summer time the production of gas is not required to be so large, and, consequently, those three beds, among others, were not used from May till August perhaps; but the use of them was resumed in the autumn of 1877, and we have continued to use them up to the present time. They have always been used in precisely the same manner. The yard for slaking the coke was used concurrently with the retort-house. Two small houses near the engine-house have been lately pulled down. When the coke is tipped out of the barrows, it is about half cooled, the upper part being black and the lower part red. The coke must be slaked considerably before being brought out of the retort-house, because the men, who work there in a state of nudity, would have their backs roasted unless they cooled the coke, which is within about two feet of their bodies. The chances are that the coke would go on burning if they did not put more water on it. My office at the works is very near the place where the coke is slaked, and the rooms over the office are occupied by a clerk in the Company's service. The house next to the works is occupied by the foreman and his wife and family. I have not been inconvenienced by the process of slaking the coke, and until this case I never heard of any person complaining of it.

By the MASTER of the ROLLS: I have been thunderatruck to hear of yellow and green steam arising from the coke. I have never seen anything of the kind, and I think it is a fabrication.

Examination continued: Dr. Redwood described the steam perfectly accurately when he said it was a vapour of pure water. I first heard of complaints made by the plaintiff in August last. When I saw him respecting it, he complained about the smoke and steam from the slaking. I expressed my regret that he should have anything to complain of, and asked him what we could do to remedy it—whether we should raise the wall at the back of his house, or whether we should put up a screen. He said he would not be satisfied with that. I asked him what he would like done, and he smiled somewhat meaningly, and said, "If you were in my place, you would either make the Company stop it, or pay well for it." I said it was idle to talk about stopping our operations; but taking his other alternative, I asked him what he thought we ought to pay, and he said he was not prepared to go into that. After some general conversation, I asked him for some suggestion, so that we might meet his views, and he repeated his former remark, that if I was in his place I should know how to make the Company stop it, or pay well for it.

The MASTER of the ROLLS: The meaning of that is, that he left it for you to find out what should be done, you being the Company's Engineer and he only a publican.

Witness: But I had suggested putting up a screen, and he would not be satisfied with that. In my experience of gas-works, I have never heard of a nuisance occasioned by the slaking of coke.

Cross-examined by Mr. CHITTY: I suggested to the plaintiff that the wall should be raised at the back of his house, but he said he wanted all the light and air he could possibly obtain. It was a choice between two evils, if slaking coke can be called an evil, which I do not think it can.

The MASTER of the ROLLS: Did you tell him it was all imaginary, and that there was no ground of complaint, or is that your present view?

Witness: I did not tell him it was imaginary.

Cross-examination continued: I told him that the Company were sorry that a neighbour should feel aggrieved, and that we would do anything in reason to satisfy him.

By the MASTER of the ROLLS: I have been in court, and have heard the witnesses speak of a smell, but (supposing it is not imaginary altogether) it does not come from the slaking of the coke. I do not pretend to say there is not, about these gas-works, the same as in all others in the kingdom, a characteristic odour of gases, and I suppose they get mixed up in people's ideas.

Cross-examination continued: There is no smell which, to my mind, is disagreeable. There is a tarry smell, and that is all. The rest is imaginary, as far as I know. There is no sulphurous smell at all, and, what is more, you cannot find it by the test-paper. You cannot detect by the nose any smell of sulphur apart from this tarry smell. In the slaking operation, there is practically no dust, and if you walked through 10 or 15 feet of the steam, you would not get any dust on your clothes.

The MASTER of the ROLLS: Then where does the dust come from?

Witness: There is dust about the works, of course, as there is in the streets. We have in the place 20 tons of coals constantly being moved.

Cross-examination continued: When the wind is towards the plaintiff's house, there may be a certain amount of dust blown there, but that I should find at my house, two miles away. There is dust flying about in every large yard, and I do not suppose the dust is imaginary. Water thrown upon coke or carbon at a high temperature would not produce sulphuretted hydrogen. I do not consider myself a scientific chemist.

Re-examined by Mr. MARTEN: I could not have failed to discover the sulphurous smell if it had existed, having been engaged in gas-works since I was 15 years of age. There would be dust blown about by a strong wind there, as there would be anywhere, and many dusty works are carried on in this neighbourhood, one being an animal charcoal manufactory.

Mr. *John Broadhurst Kent*, examined by Mr. ROMER.

I am the Manager of the defendant's works, acting under the orders of Mr. Jones. I have been in the Company's employ for the last three years. The Company lately pulled down two houses, but a very small portion, if any, of the site of these houses has been used as a place on which to slake the coke. The retort-house, marked "B" on the plan, contains five beds, each bed containing nine retorts, and the five beds have all been used at the same time. There are only two in use now. As a rule, only three have been used at one time. The coke is thrown out at the side of the retort, near the coke ground, and there quenched. I heard Mr. Jones's evidence as to the way in which the coke is drawn from the retorts, and I agree with what he said. It is my duty to be in the yard the whole of the day, but I did not see Mr. Keates on Saturday week. On that day there was no difference in the method of quenching the coke, to my knowledge. I am certain I gave no orders that a different plan should be adopted. When water is thrown upon coke in the yard, steam arises. If there is any colour in the steam, it is a slight yellow. There is no sulphurous smell in it, nor any offensive smell of any kind. I have repeatedly stood in the steam, but I have never detected any offensive smell. I have tested the steam with test-papers, but have never found the slightest trace of sulphuretted hydrogen. The steam does not throw off dust like pepper. If any dust is thrown off, it must be very slight, not sufficient to spoil a person's dinner 20 yards off. The men often eat their dinners in the retort-house, but I have never heard any complaints by them. Until the plaintiff complained, there had been no complaints about the slaking of the coke at the Company's works. This yard has been used for the purpose of slaking coke since the autumn of 1876—with the exception of the summer of 1877—continuously. I was present at the interview between Mr. Jones and the plaintiff, and can corroborate Mr. Jones's evidence as to what passed. I remember Dr. Tidy and others inspecting the operation of slaking, and the process was conducted in the ordinary manner. The only dust-creating factory in the neighbourhood is that of the Animal Charcoal Works.

By the MASTER of the ROLLS: I do not suggest that dust comes from those works to the plaintiff's premises; I was not asked that question.

Cross-examined by Mr. CHITTY: I never heard any other complaint except the plaintiff's. Mr. Hurst has complained; but that was on the same afternoon. To my knowledge there is no dust arising from the process of slaking; at least I have never seen any. I have seen a kettle boil over on an ordinary fire, but I have not noticed any dust; there may be a little dust at first. There is no smell arising from the slaking of coke in this yard. When a kettle boils over there is some smell; but that is a different thing altogether. When the coke comes out of the retort-house, the top part is black and the bottom red. The barrows are open at the side, and there is a considerable draught through them as they are dragged along. I have tested with lead paper for sulphuretted hydrogen since the date of the complaint; but I did not find any. The men would, no doubt, see when I was testing.

By the MASTER of the ROLLS: I have never been in the plaintiff's house. I have noticed the steam go over the plaintiff's house when the wind was in that direction; but I have not seen any dust. I have occasionally seen clothes hanging out to dry upon the plaintiff's premises; but I have not examined them to see whether they were black.

Alfred Henry Rose, examined by Mr. MARTEN.

I am foreman of the purifiers. I live opposite the gas-work gates; my house being next to Mr. Jones's office. Neither I nor my family have suffered any inconvenience or annoyance from the process carried on, and have always enjoyed good health. I do not find fault with the smell from a purifier. I do not find any unusual quantity of dust.

By the MASTER of the ROLLS: I have been once in the plaintiff's house, but I could not say which way the wind was blowing at the time.

Dr. *Charles Meymott Tidy*, examined by Mr. MARTEN.

I am a Bachelor of Medicine, Master of Surgery, Member of the Royal College of Surgeons, Fellow of the Chemical Society, Member of the Institute of Chemistry, Professor of Chemistry and Lecturer on Forensic Medicine and Public Health at the London Hospital, Medical Officer of Health for the Parish of Islington, and was for some time deputy Medical Officer of the City of London. I am theoretically if not practically acquainted with the manufacture of gas. I visited the defendants works on the 30th of December and the 30th of January. On the first occasion I carefully examined the works, the system adopted for slaking coke, and also the piece of ground upon which the coke is deposited. I had some of the retorts drawn in my presence, and the coke treated in the ordinary manner. I am perfectly familiar with the process, and should have known at once if any but the ordinary one had been adopted; but I may say that is a matter of no importance, as I will presently show. The coke was wheeled out in our presence, and again slaked, and I examined very carefully to see if I could discover any trace of sulphuretted hydrogen or sulphurous acid produced by the slaking. On the first occasion I used lead paper and litmus paper, and the much more delicate test for sulphurous acid—iodate of potash and starch. I held this over the coke as it was being slaked in the yard, but there was not the slightest trace given off. On the second occasion I visited the works in company with Dr. Voelcker. We both repeated the experiment in the yard, using litmus paper and lead paper, but without any effect. Dr. Voelcker then suggested that we should go into the retort-house, have the coke drawn out, and immediately slaked, and that we should then test the vapour given off. I may say that Dr. Voelcker and myself were not more than 3 or 4 feet from the barrows into which the coke was raked from the retorts. It was actually the red-hot coke as it was drawn. When the water was poured on to this coke, the volume of steam given off was so dense that I was unable to see Dr. Voelcker, though he was within three feet of me. We both held lead paper and litmus paper in our hands, but they were absolutely unaffected. I would further say, that when we are told of sulphurous acid and sulphuretted hydrogen being given off, this is a kind of scientific contradiction, inasmuch as they could not exist together, one having the power of neutralizing the other. The coke, when brought out in the barrows, was black at the top and dull red underneath; but even supposing there was a bright red heat, that would not decompose the

water, so as to form sulphuretted hydrogen. I have lately made a great many experiments to see whether coke will decompose water, so as to give off sulphuretted hydrogen; and without asserting that it is altogether impossible, I may say it is absolutely certain that the coke is never drawn off at a sufficient heat to do so. I can scarcely do it in my own laboratory. The formation of sulphuretted hydrogen depends upon whether the water can be decomposed into its constituent gases; it can be at an exceedingly high temperature, but the temperature is not one to which the coke can be brought in the retort-house. I say there is no sulphurous acid. Steam is produced by the slaking in the yard, and it has been fairly described as a whitish vapour, with a yellow tinge. No offensive smell was given off when the coke was being cooled at the heaps.

The MASTER of the ROLLS wished to draw Counsel's attention to the fact that the witnesses for the plaintiff had inspected one side of the works, but those for the defendants had not. The defendants did not seem to have taken the trouble to send anybody there. It was not for a man complaining of a nuisance to show how it arose, but simply to prove its existence. To his lordship's mind, the defendants evidence was of the most unsatisfactory nature, and he wished to direct counsel's attention particularly to that fact.

[The piece of painted wood which was said to have been discoloured by sulphuretted hydrogen was handed to Dr. Tidy, who stated, in answer to his lordship, that he could not say the discoloration was not due to that cause.]

Examination continued: No doubt sulphuretted hydrogen is given off from gas-works; but the question here is whether it is given off by the quenching of the coke, and that I can most positively deny. When I said there was an absence of sulphuretted hydrogen, I simply meant in the quenching of the coke.

The MASTER of the ROLLS said he was not trying scientific questions, but simply the question of the existence of the nuisance, and it did not matter where it came from.

Witness: I am directing my attention to the quenching of the coke.

The MASTER of the ROLLS: But the only question I have to try is nuisance or no nuisance. The plaintiff may be wrong as to the source of it, but the fact may remain that there is a nuisance.

Witness: I am absolutely certain that sulphuretted hydrogen does not come from the source the plaintiff states. Sulphuretted hydrogen may come from gas-works, but I cannot say that the board produced was discoloured by sulphuretted hydrogen coming from the defendants works. I should like to know all the surroundings of the board before I stated that.

Examination continued: I think there can be no doubt that, at works where there is a large quantity of coke and coal being moved about, there cannot be otherwise than a certain quantity of dust. I do not see how that can be disputed; but, at the same time, it cannot be true that there is anything like a large quantity thrown off in quenching the coal, and I will give my reason for saying so. I was in the midst of the quenching for some time when I went to the gas-works, and my coat did not show any signs of dust upon it; and on the second occasion, when I inspected the place in company with Dr. Voelcker, neither of us had any necessity even to brush our hats afterwards.

Cross-examined by Mr. CHITTY: I consider that no sulphuretted hydrogen can be produced by this process. When I stated in my affidavit that the coke is not incandescent when brought out of the retort-house, and that it is removed a sufficient distance to render it black, though it is not thereby rendered completely cool, I was speaking of the coke at that particular time. As a rule, I say the coke is not incandescent in the sense of glowing; incandescence means the power of giving out light, and I do not call a dull red heat incandescence. What I mean is this, that the coke is drawn out when intensely hot; water is then poured over it, and a large part of it is thereby rendered black, and the intense white heat taken away. I meant to say that part of the coke was black and part of it red when I said it was removed sufficiently far to render it black.

The MASTER of the ROLLS thought the affidavit was somewhat exaggerated, and that Dr. Tidy had better at once admit it.

Witness was not at all prepared to acknowledge that it was exaggerated in any way.

Cross-examination continued: I do not think there is any exaggeration in what I state in my affidavit. I say that incandescence means a white heat. I never heard of coke coming out of a retort-house at such a heat as to decompose water, and I can scarcely conceive it possible. Of course, it is possible that a trace of sulphuretted hydrogen might be produced; but, as a fact, I have never found it so produced.

Dr. *Augustus Voelcker*, examined by Mr. ROMER.

I am a Member of the Royal Society, Vice-President of the Institute of Chemistry of Great Britain, Fellow of the Chemical Society, and Consulting Chemist to the Royal Agricultural Society. I have been a Consulting and Analytical Chemist for nearly 30 years, and have had great experience in the manufacture of gas, and its effects. I examined the defendants works at Wapping on the 30th of January, in company with Dr. Tidy, when we witnessed the operation of drawing the retorts and quenching the coke. I did not examine any other operation which was going on at the time, but confined myself to the operation of quenching the coke, because I understood a complaint had been made that a serious nuisance was produced by it. The quenching was going on in the yard at the back of the retort-house. I did not arrange with the Company to come on a certain day. The process employed has been very fairly described by Mr. Keates. I stood in the midst of the steam, and I must say I could not detect, either by test-papers, respiration, or smell, the slightest trace of sulphuretted hydrogen or sulphurous acid. If sulphuretted hydrogen had been present, the tests I used would have detected it. The steam given off would not be injurious to health, though it would not be comfortable in volumes. I conceive that inconvenience might arise to a person if coke were quenched close to the wall of his house, but if at some distance, no serious inconvenience would be produced.

By the MASTER of the ROLLS: By "some distance," I mean 40 or 50 yards; the steam would be dispelled in the atmosphere.

Examination continued: There was a peculiar smell in the steam, which was not pleasant—no steam is; but there were no impure gases present. If you throw a pailful of water upon coke, little particles of coke must rise; but the quantity of dust occasioned in this way must be infinitely less than the dust produced by carting coke and coal from one place to another. I did not perceive any dust arising from the operation.

Cross-examined by Mr. CHITTY: The works had not been swept and garnished before I arrived. I did not see any other scientific gentleman there than Dr. Tidy.

By the MASTER of the ROLLS: The board which has been produced has been discoloured by sulphuretted hydrogen or sulphide of ammonium. I cannot say how it reached there; but I can say positively it is not produced by the quenching of the coke. Sulphuretted hydrogen would, in all probability, come from the ammoniacal liquor tanks, the purifiers, or the "blue billy"—spent lime. A considerable quantity of sulphuretted hydrogen must have come from somewhere to have discoloured the board in the manner it is.

Mr. *George Arthur Rogers*, examined by Mr. MARTEN.

I reside at 164, High Street, Shadwell, and am a Member of the Royal College of Surgeons, Medical Officer of Health and Food Analyst for the Limehouse district. I inspected the plaintiff's house in consequence of complaints made by him to the Metropolitan Board of Works. He complained of the smell arising from defendants purifiers, and the carts engaged in carting the lime away. Incidentally he mentioned having experienced some annoyance from the slaking of coke. I saw the quenching going on, and steam arising when the water was poured upon the coke. Officially I have not heard of complaints being made by other people. I saw the process in operation on the 28th of December, but no sulphuretted hydrogen was given off. I used test-papers, but no effect was produced upon them. The test I used would have detected sulphuretted hydrogen if it had existed. I am of opinion that nothing is evolved from the coke, in the act of quenching, which can be injurious to the health of persons residing in this neighbourhood. I cannot trace any connection between the quenching of the coke and bronchitis, from which it is said the plaintiff's wife is suffering.

Cross-examined by Mr. CHITTY: When the coke was thrown into the yard, it was black on the top. I should describe it as a heap of black coke. When I visited the defendants works I was accompanied by the Engineer of the Company, and went by appointment. Two or three complaints were made in the year 1878.

Re-examined by Mr. MARTEN: These complaints did not refer to the quenching of the coke.

By the MASTER of the ROLLS: I was never at the plaintiff's house when the wind blew towards it. I did not notice any particular smell in the steam.

Mr. *George Wood*, examined by Mr. ROMER.

I am a butcher, and reside at 86, Wapping Wall, near the defendants works. I know the plaintiff's house, and generally go into it five or six times a day. I have never suffered any annoyance from dust or steam from the gas-works while there. I have never seen any food injured by dust. I never had to leave the house in consequence of any unpleasant smell. The meat in my shop has not been covered with dust from the gas-works. Neither I nor my family suffer from the defendants works; we have always had good health. Trade in our neighbourhood, and for miles round, is not so good as it used to be. A great many houses have been pulled down.

Cross-examined by Mr. CHITTY: I have supplied meat to the gas-works at Christmas. My premises are about 80 feet from the works. I have heard one or two persons complain of the nuisance—perhaps two or three, or it might be three or four; but I will not say five or six. I have heard the plaintiff complain.

Mr. *William White*, examined by Mr. MARTEN.

I am a miller, residing in High Street, Wapping. My warehouse adjoins the gas-works; the coke is slaked in front of my window. I have never experienced any ill effect from the steam or dust. I have from 15 to 20 men in my employ, and they have never complained to me.

Cross-examined by Mr. CHITTY: I have no interest in the gas-works; but I have a right of way over part of their property, with their consent.

By the MASTER of the ROLLS: I have never heard any complaint made by any one. I do not associate with persons about there.

WEDNESDAY, FEB. 26.

Mr. *William Rains*, examined by Mr. MARTEN.

I am Inspector of Nuisances for St. George's-in-the-East, and reside at the Vestry Hall. I know the defendants works, and have often seen the slaking of coke going on at the back of plaintiff's premises, and in High Street, Wapping. I have passed through the steam when the water was poured on the coke, and have always failed to detect any smell. The steam always appeared to me to be of a white colour. I am used to sulphurous smells when fumigating. I believe the steam is not injurious to health. I have only had complaints from the plaintiff. I went to his house in May last, at his request. He accompanied me. I went through the bar, up the stairs, and on to the leads. The wind was blowing westward—from the yard towards the house. It was a strong wind, and the damp steam was blowing directly over the leads. There were several particles of small flakey dust flying about. I detected no smell. I said I thought that was too bad, and I must report to the Vestry. I put it in the book, but I did not report it, because it was, in fact, beyond my boundary. I heard no more till the 15th of July, when the plaintiff accompanied Mr. Cook and other gentlemen to the Vestry meeting. I then went to the defendants works, with Mr. Stare, the Inspector of the district within which the plaintiff's house is situate. My assistant, Mr. Woolton, was with me. We went on the ground where the slaking was going on. We stood in the steam with test-papers in our hands, and they were not discoloured. We used the proper test-papers for sulphuretted hydrogen, and detected no unwholesome or unpleasant smell. I believe the visit to the works was without notice to the Company. I have failed to detect anything injurious to health, except upon the one occasion I have mentioned.

Mr. CHITTY stated that some suggestions had been made on the other side, and it might not be necessary to ask the witness any questions.

Counsel on both sides then held a short conference, at the conclusion of which,

Sir H. JAMES said: I have had communicated to me what took place yesterday. My clients desire to carry on their works so as not to be in any way a nuisance to any of their neighbours. In the first place, they have no right to do so; and, in the next place, they have no wish to do so. I am perfectly willing that the suggestion which I understand was made yesterday by Mr. Keates shall be carried into effect substantially. We will provide a roof or screen which will enable us to carry on our operations; and we will give an undertaking that there shall be no nuisance. Probably the better way will be to give liberty to the other side to apply, if they say we have not done the work properly.

Mr. CHITTY: It will simply be an undertaking. They tell us what they are going to do.

The MASTER of the ROLLS: I must say there is less conflict of evidence than is usual in these cases.

Mr. MARTEN: Your lordship has not heard all our case.

Mr. CHITTY: His lordship heard the best of it. Although I do not say it is in the least degree probable that the defendants will break their undertaking, nevertheless they are a Company, and we must have liberty to apply for an injunction in case of a breach being committed.

The MASTER of the ROLLS: Very well. I think, Sir Henry James, your clients should take well into consideration what Professor Voelcker said as regards the sulphuretted hydrogen. I think you ought to look to some other parts of your works; at all events, the attention of your clients should be called to it.

Sir H. JAMES: That will be seen to, my lord.

The MASTER of the ROLLS: I cannot help thinking that sulphuretted hydrogen does escape from some part of the works, which has nothing to do with the slaking of the coke. I am sure the Company will look to it, because they do not want another action.

Mr. MARTEN: Of course, my lord.

Mr. CHITTY: They undertake to carry on their business at the works in question in such a manner as not to cause a nuisance to the plaintiff or

his customers from any escape of noxious vapour, and so on. I do not want any other word but "nuisance;" that is, I do not want the word "annoyance;" and the rest of the order is arranged.

EXCHEQUER DIVISION.—Tuesday, Feb. 25.

(Sittings at Nisi Prius, before Baron Huddleston *and a Special Jury.)*

UPWARD *v.* WEST MIDDLESEX WATER-WORKS COMPANY.

The plaintiff sought to recover compensation for personal injuries caused by the alleged defective condition of a plug-hole. The defendants denied their liability, upon the ground that the hole was of the description generally used.

Mr. Mathews, Q.C., and Mr. E. Clarke appeared for the plaintiff; Mr. Grantham, Q.C., and Mr. Petherham represented the defendants.

The plaintiff is a civil engineer, living in Linden Gardens, Uxbridge Road, and carrying on business in Great George Street, Westminster. While he was walking with his wife to church on Sunday afternoon, Feb. 9, 1877, and crossing the road at the junction of Linden Gardens and the Uxbridge Road, his wife asked him to step back so to avoid a Hansom cab. In doing so his foot caught in one of the defendants plug-holes, and he was thrown down with such violence that he was much bruised and shaken, and one of his ankles became permanently injured.

The Jury gave a verdict for the defendants, and judgment was entered accordingly.

Miscellaneous News.

METROPOLIS WATER SUPPLY.

Conference of Delegates from Vestries.

Last Thursday, a meeting of representatives of the Metropolitan Vestries was held in the St. Martin's Vestry Hall—Mr. E. J. Watherston in the chair—in order to consider the question of the Metropolis Water Supply. The meeting, after passing the following resolutions, adjourned till Thursday, March 27:—

Whereas great complaints have, for some time past, been expressed in the various localities of the Metropolis supplied by the Water Companies, owing to the water-rates having been considerably increased without any apparent justification, it behoves the consumers to institute inquiry and collect information, with a view to obtain the means of ensuring an equitable adjustment of the burden by taking such steps as the circumstances may require.

That it appears, by reference to the various local Acts of the Companies, affecting in each case a definite district, certain inequalities prevail, not only in the pound rate of charge, but also in the various incidents—viz., the graduated scale charged for baths, water-closets, high service (including the level from which high service commences), and other matters; and, moreover, as the rate is required by law to be fixed according to the annual value of the property rated, it appears uncertain whether the Companies adopt the rateable value under the Valuation (Metropolis) Act, 1869, or the gross estimated rental as defined by that Act, or fix upon some arbitrary standard of value, therefore an explanation on all these points is required in the interest of the consumers.

That it appears by the return of the Metropolitan Board of Works that the rateable value of the Metropolitan parishes, which, in 1856, was £11,283,663, was, in 1876, increased to more than double that sum—viz., £23,111,313, showing that the income of the Water Companies must have enormously increased in that interval, whatever the basis of rating adopted by each Company.

That this meeting is of opinion that it is desirable that each of the Vestries and District Boards should obtain a copy of the Act of the particular Water Company which rates their parish or district, in order to ascertain the powers conferred upon the Company for that purpose; and that such Vestries and District Boards obtain from some of the principal consumers information showing in what way those powers are exercised as to annual value and otherwise, and what has been the nature and relative amount of any late increase in the rates; and that such information, as early as possible, be forwarded to St. Martin's Vestry Hall, headed "Water Supply Committee."

That the delegates be a general committee for effecting the objects proposed, with power to appoint one or more sub-committees to act under them, with all suitable powers.

Lieut.-Col. Bolton, in his report for January, says: "The state of the water in the Thames at Hampton, Molesey, and Sunbury (where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, Chelsea, and East London Companies are situated), was very turbid from the 1st to the 8th of January; it then became a little clearer, but remained in an indifferent condition till the 15th, after which it again became turbid, and continued in a bad state until the 24th, after which it fined down, and was good during the rest of the month. The highest flood state of the river at Molesey during the month was 6 feet 11 inches, and the lowest 2 feet 1 inch above the summer level. The rainfall for the month, as taken at the Chelsea works at Molesey, was 2·71 inches. The water in the River Lea was very turbid during the greater part of January."

OTTOMAN GAS COMPANY.

The Annual General Meeting of this Company was held at 53, Cannon Street, London, on Thursday, the 27th ult.—E. Horner, Esq., in the chair.

The Secretary (Mr. A. J. King) read the notice convening the meeting, and the following report and statement of accounts were presented:—

The Directors herewith present the audited statement of accounts for the year ended Dec. 31, 1878.

The gas-rental for that period amounts to £7288 6s. 2d., and the net profit (after paying interest on debentures) to £2701 17s. 5d, which, added to the balance brought forward, makes the sum of £3220 13s 1d., which the Directors propose to deal with as follows:—

A dividend of 7 per cent. on the preference shares	£568	15 0
A dividend of 3 per cent. on the ordinary shares	1500	0 0
To write off from the preliminary expenses account	500	0 0
Leaving a balance to carry forward of	651	18 1
	£3220	13 1

And resolutions will be proposed at the general meeting accordingly.

During the year the Directors have paid off debentures to the extent of £1950, reducing the amount of debenture debt to £1750.

The Directors regret to have to record the loss of two of their colleagues (Dr. Fraser and Mr. E. Deffell) and of one of the Auditors (Mr. Bowsell) during the year. They have invited Mr. Arthur Clarke to join the Board in place of Dr. Fraser, deceased.

The Directors retiring in due course are S. A. Beck, Esq., and Arthur Clarke, Esq., who offer themselves for re-election.

The Auditor, George Allin, Esq., and Charles Butt, Esq., Provisional Auditor, offer themselves for re-election.

Balance-Sheet, Dec. 31, 1878.

Dr.				Cr.			
Capital	£50,000	0	0	Plant	£45,519	0	7
Do., preference shares, viz.—				Concession and preliminary expenses	12,500	0	0
1025 shares, £5 paid	5,125	0	0	Amount owing for public lights	2,270	12	5
1000 shares, £3 paid	3,000	0	0	Sundry debtors	3,493	19	10
	£58,125	0	0	Stocks	4,974	1	4
Debentures	1,750	0	0	Office furniture	60	0	0
Sundry creditors	6,384	8	6	Cash	662	7	5
Profit and loss account—							
Amount brought forward	518	15	8				
Add for 1878	2,701	17	5				
	£69,480	1	7		£69,480	1	7

Profit and Loss Account for the Year ending Dec. 31, 1878.

Cost of coals	£2,514	9	10	Gas-rental	£7,288	6	2
Wages and materials	941	17	6	Products	1,681	1	5
Salaries and office expenses, Smyrna	1,074	18	5	Net profit on chandeliers, fittings, meter-rents, &c.	709	0	8
Bad debts and allowances	97	19	1	Transfer fees	2	10	0
Exchange	455	18	0				
Repairs and renewals	313	14	1				
Debenture interest	163	10	0				
Directors fees	300	0	0				
Interest and discount	138	16	3				
Income-tax	38	19	3				
Rent, salaries, and office expenses, London	319	18	5				
Balance (profit)	2,701	17	5				
	£9,071	18	3		£9,071	18	3

The Chairman: I will now move—"That the report of the Directors be received and adopted." I regret that Mr. Beck, the Chairman, is unable to attend here this morning, in consequence of his having important business elsewhere. I think, if you look at the accounts, you will find that, notwithstanding the very depressed state of trade at Smyrna, as well as in all other places, there is a very considerable improvement indeed in them. You will observe from the balance-sheet that there has been an additional sum of £1200 invested at Smyrna, which has been almost entirely spent in pipes for the extension of the business; while, on the other side of the account, you will see that the debentures have been reduced from £3700 to £1750. I think it is something to say that we have reduced a permanent liability of that sort to the extent of £1950. The working of the accounts shows an increase in the rental of about £400. The residual products have increased about £260 in favour of the Company, and the profit has also increased £606, which I consider, when we look at the existing state of things, is most satisfactory. Of course, there are very great difficulties to contend with in a place like Smyrna. Petroleum is greatly in favour there, and I believe there are some streets lighted with it; but I think it will be given up, and we are informed that if they attempt to extend its use, it will cause a revolution. It is not approved of by the people, whatever the authorities may think of it. However, the end of it is that we are able to propose to you a better dividend than on the last occasion, and I think that now we have peace, the enormous trade of Smyrna must make it a very good town for lighting. Looking at the immense population, £7280 is a very small sum to receive from a city containing 200,000 people. From such a place, the amount ought properly to be three or four times that sum; but, as an old friend of mine at Smyrna once told me, Turks go to bed very early, so that there is not the night consumption there is in many European towns.

Mr. Dove seconded the motion.

In answer to a question by one of the Shareholders,

The Chairman said they were not troubled with the electric light in Smyrna, and therefore it was not worth while to deliver a lecture about it; but circumstances had shown lately that gas companies had nothing to fear from that light. There was no question that for less than half the money that the electric light cost, an equally powerful light could be furnished by gas, and there were other advantages which gas had over electricity.

The motion for the adoption of the report was unanimously agreed to.

The Chairman then moved—"That a dividend of 7 per cent. on the preference shares, and 3 per cent. on the ordinary shares, be and is hereby declared, both free of income-tax."

Mr. Clarke seconded the resolution, which was agreed to.

On the motion of the Chairman, seconded by Mr. Hounsom, the retiring Directors were re-elected.

The retiring Auditors were also reappointed.

The Chairman: You will observe by the report that we have lost during the past year two of our Directors, Dr. Fraser and Mr. Deffell, who had both been connected with this Company from the commencement. They were exceedingly estimable gentlemen, and always worked with us with the greatest unanimity. It causes us great regret to lose such old friends, and I am sure that the Proprietors will sympathize with the Board in the loss they have sustained.

A vote of thanks to the Chairman and Directors was proposed, and cordially agreed to.

The Chairman: On behalf of the Directors and myself, allow me to say that we appreciate very highly the motion which has just been made and carried. Of course, we should like to see this Company more prosperous; but although our dividend is at present small, I think this is as sound a Company as any you can name. We are constantly diminishing our preliminary expenses, and do not go on dividing all our profits; and although that does reduce the dividends a little, we are laying a good foundation, which in years to come must tell greatly in our favour, and no doubt will produce a compound profit much larger than if we had divided the whole amount now.

Mr. W. H. Evans asked if the Chairman could give the Shareholders any hope that when the debentures were paid off the dividends would be augmented.

The Chairman said the Board hoped that would be so.

The proceedings then terminated.

BARNET DISTRICT GAS AND WATER COMPANY.

The Half-Yearly Meeting of the Proprietors of this Company was held at the Guildhall Tavern, Gresham Street, London, on Friday, the 28th ult.—J. F. Bontems, Esq., in the chair.

The Secretary (Mr. Alfred Lass) read the notice convening the meeting, and the following report and statement of accounts were presented:—

The Directors beg to submit to the Proprietors the accounts for the half year ending Dec. 31, 1878.

The balance of the profit and loss account (net revenue) amounts to £2778 1s. 7d., out of which the Directors recommend a dividend for the half year ending the 31st of December last, at the rate of £4 15s. per cent. per annum on the A stock and shares, and £3 15s. per cent. per annum on the B stock.

The gas-rental for the last half year has amounted to £4591 9s. 7d., which shows an increase of £404 5s. 10d. on the corresponding period of last year. The water-rental has amounted to £2495 10s. 4d., which shows, on the same period, an increase of £368 0s. 7d.

The new well continues to yield an ample supply of water, and the machinery is working satisfactorily.

The old well is now being enlarged and deepened, and the diameter of the bore increased, the result of which will considerably increase the supply of water from this well. Contracts are being entered into for duplicate engine and pumps. These extensions and improvements, together with the increased sizes of the mains, will enable water to be raised and distributed with much greater economy.

At the solicitation of the residents at Potter's Bar, your Directors entered into a provisional agreement to supply that district with water, and the necessary steps were taken to obtain parliamentary powers to enable them to do so. This agreement was entered into with the full belief that the various Local Authorities would have helped forward a scheme which was intended to benefit the residents of a district now wholly unprovided with a good supply of water; but, as soon as it was ascertained that the necessary assistance and co-operation of the various authorities could not be relied on, your Directors determined to abandon the undertaking.

The retiring Directors are J. F. Bontems, Esq. (the Chairman), Henry T. Balfour, Esq., and Charles Horsley, Esq., who, being eligible, offer themselves for re-election.

The retiring Auditor is J. I. H. Gibbins, Esq., who, being eligible, offers himself for re-election.

The vacancy occasioned by the death of your late Auditor, Edward Beckwith, Esq., will also be filled up.

The dividend, if sanctioned, will be payable on the 15th day of March next.

Dr.—*Gas Revenue Account, for the Half Year ending Dec. 31, 1878.*

To Manufacture of gas—			
Coals	£1579 19 1		
Purifying	61 9 6		
Wages	116 13 4		
Repair and maintenance—works and plant	245 17 8		
Salaries of Engineer, &c.	230 16 10		
		£2234 16 5	
Distribution of gas—			
Salaries—Inspector and Clerks	£120 7 9		
Repair and maintenance—mains and services	168 9 9		
Repairing and renewing meters	23 13 0		
		312 10 6	
Public lamps—			
Lighting and repairing		81 0 4	
Rent, rates, and taxes—			
Rent	£3 5 0		
Rates and taxes	83 6 11		
		86 11 11	
Management—			
Directors allowances	£100 0 0		
Salaries—Secretary and Accountant	100 0 0		
Collector's commission	67 10 3		
Stationery and printing	58 18 2		
General establishment charges	66 7 6		
Auditors fees	2 12 6		
		395 8 5	
Law charges		8 8 1	
Bad debts and allowances		25 2 10	
		£3143 18 6	
Balance to profit and loss account, net revenue		2450 5 9	
		£5594 4 3	

Cr.—*Gas Revenue Account.*

By Sale of gas—			
Private rental	£4289 3 10		
Public lighting	302 5 9		
		£4191 9 7	
Rental of meters		103 8 4	
Residual products—			
Coke	£656 7 0		
Breeze	26 0 6		
Tar	92 19 9		
Sulphate account	99 19 1		
		875 6 4	
Rent account		24 0 0	
		£5594 4 3	

Dr.—*Water Revenue Account.*

To Coals	£378 1 8		
Wages	187 0 7		
Repair and maintenance—works and plant	174 13 1		
Salaries—Inspector and Clerks	23 15 0		
Repair and maintenance—mains and services	320 13 2		
Salaries of Engineers, &c.	58 6 8		
		£1142 10 2	
Rent	£25 0 0		
Rates and taxes	41 13 5		
		66 13 5	
Directors allowances	£50 0 0		
Salaries—Secretary, Accountant, &c.	50 0 0		
Collector's commission	33 15 1		
Stationery and printing	29 9 1		
General establishment charges	33 3 9		
Auditors fees	1 6 3		
		197 14 2	
Law charges		11 13 9	
Bad debts		32 4 1	
Special items		108 10 0	
		£1559 5 7	
Balance to profit and loss account, net revenue		964 7 3	
		£2523 12 10	

Cr.—*Water Revenue Account.*

By Sale of water	£2495 10 4
Rents	28 2 6
	£2523 12 10

Dr.—*Profit and Loss Account, Net Revenue.*

To Dividend paid to Shareholders for the half year ending June 30, 1878	£2170 10 3
Interest on loans and mortgage bonds to Dec. 31, 1878	675 8 3
Interest on temporary loans and moneys received in anticipation of calls	107 0 8
Balance available for dividend for the half year ending Dec. 31, 1878	2778 1 7
	£5731 0 9

Cr.—*Profit and Loss, Net Revenue.*

July 1, 1878—	
By Balance brought from last account	£2210 12 1
Dec. 31, 1878—	
Revenue account, gas	2450 5 9
Revenue account, water	964 7 3
Fitting account	105 15 8
	£5731 0 9

The Chairman, in moving the adoption of the report and the declaration of dividends, said: I shall have very little to say about the report and the balance-sheet. They are clear and simple, and I think easily understood. The most important part of the report, I dare say you will consider, as I do, is the dividend, and perhaps you may feel some little disappointment that it is not higher. I confess that I did expect we should receive 5 per cent. dividend this half year, and perhaps if we had strained a point we might have paid you that amount; but there were circumstances to be considered, which made us think it would be safer to keep to the same dividend as last half year. This being the heavier half year for the rental, and the next the lighter, we thought it would be a pity to pay a 5 per cent. dividend now, and have to return to 4¾ next half year, and that it was preferable to pay you the lower rate of dividend now. As we have carried something forward, we think there is no doubt that 5 per cent. will be declared for the next half year. The increase in the gas-rental is satisfactory—namely, £434 5s. 10d; and the increase in the water-rental is £368 0s. 7d.; making a total increase of £772 6s. 5d., which, I think, is encouraging. The new well has proved to be quite satisfactory. The ample supply which it yields has fully answered all our expectations. We are now, as the report states, improving the old well. We are making that the same width as the other, and a little deeper, so that we shall have two wells producing an equal supply. We propose making a headway from one to the other, so that we may use either well and either machinery, as occasion may demand. Of course, that has rendered it necessary to put an engine to the old well, which will be equal, if not superior to that which is at the new well; and when both are made the same size, and deepened to about the same depth, with a headway connecting them, and having two capital engines and the requisite pumps, we shall be quite equal to furnishing all the water required for many years to come. One paragraph in the report refers to the supply of water to the district of Potter's Bar. That is outside our parliamentary district, but the people residing there are very badly off for water, and the poor are suffering very much in consequence; and although it would scarcely, with the present inhabitants, have returned us a 5 per cent. dividend, yet we thought we would strain a point, and try to supply them. We did this very much in consequence of the great pains and trouble taken by Mr. Parker, one of the residents in that district, in order to induce us to supply the poorer people with water. We took the necessary steps, at the expense of £108, to obtain parliamentary sanction; but, strange to say, with the usual selfishness that prevails in the district, the letters in newspapers, and the remarks made at the meetings of the Local Authorities, led us to expect that we should have such requisitions made upon us as it would be very undesirable we should submit to. We therefore declined to lay on the water. It is not our fault that the poor people will not be supplied, but it is the fault of those who raised the objections to it. You will see we have expended a little more capital during the half year. I am sorry to say that is necessary now, and will be so as we go on, for some time to come. We are quite aware that we have already exceeded the amount of capital that ought to be expended, but the expenditure has been chiefly on the water supply, and the money has been laid out with as much care as possible. The increase of the gas capital is £853 17s. 11d., and of the water capital £2206 8s. 2d., making a total of £3060 6s. 1d.; but £2362 16s. 3d. out of that has been expended for new water-mains, which must very soon increase the rental of the Company.

The Deputy-Chairman (Mr. Glaisher) seconded the motion. In doing so he said he was exceedingly pleased that the Company were attacking the problem of enlarging the old well. The result of that would be to place the district entirely in the Company's hands. When the enlargement was completed, they would never have any difficulty in supplying even a very much larger district. He regarded that as a very great feature in the present report, and he was glad to be able to say that the sinking of the well was proceeding in the most satisfactory manner.

Mr. Sporne said he was quite satisfied at the prosperous condition of the Company, as indicated in the report, but he wished to ask how it was that while more gas had been supplied, the amount received for coke was only £656, as against £690 last year. He also desired to know if the Directors had any idea of reducing the price of gas. He was not a resident in the district, but he thought if the Directors saw their way to making a reduction in price, the consumption would be increased.

The Chairman said the difference in the returns from coke was caused by the reduced price at which it was sold. With respect to the price of gas, the Board had repeatedly pledged themselves that when the Proprietors were sure of a 5 per cent. dividend, any further profits should be shared between the Shareholders and the Consumers.

Mr. Clarke thought it was a great mistake not to supply gas at the very cheapest rate possible. If the price were lower, consumers would use gas for heating and cooking purposes as well as for lighting.

Mr. H. P. Stephenson said the Shareholders did not want their dividends lessened by a reckless reduction in the price of gas. The whole matter, he considered, ought to be left to the discretion of the Directors.

Mr. Glaisher said ever since he had been upon the Board he had been an advocate for a reduction in the price of gas; but he thought that prudence dictated that the proper time had not yet arrived. As the Chairman of the High Barnet Company, he urged his Shareholders to agree to the amalgamation, because he felt confident that they would receive 5 per cent.; but at present they only had 3¾. Still he had never yet been able to concur in the suggestion to reduce the price.

The Chairman said High Barnet was supplied at 4s. 6d. per 1000 feet, but the lowness of price there did not make any great difference in the amount of consumption. The Colney Hatch Company, who had not to lay down pipes to anything like the same distance as the Barnet Company, charged the same price they did—6s. In order to earn a tolerable dividend they were obliged to obtain power to raise the price from 5s. to 6s.

The motion was unanimously agreed to.

The retiring Directors, Messrs. Bontems, Balfour, and Horsley, were re-elected, as was also the Auditor, Mr. J. I. H. Gibbins.

On the motion of Mr. Sporne, seconded by Mr. Lennard, Mr. John Johnson was appointed Auditor, to fill the vacancy occasioned by the death of Mr. E. Beckwith.

Votes of thanks were accorded to the Secretary, the Engineer and staff, and to the Chairman and Directors, and the proceedings terminated.

IPSWICH GASLIGHT COMPANY.

The Annual Meeting of this Company was held on Monday, the 17th ult.—Mr. W. Bunn in the chair.

The seal of the Company was affixed to the list of Shareholders, the minutes of the last meeting were read and confirmed, and the following report was taken as read:—

The Directors have pleasure in presenting to the Shareholders the audited statement of accounts for the year ending Dec. 31, 1878.

The profit and loss account shows a balance, available for the payment of dividend, amounting to £6001 10s. 1d. The Directors, therefore, recommend that a dividend of 10 per cent. per annum be paid upon the shares class A, and 7½ per cent. on shares classes B and C, and that the balance of £761 11s. 4d. be carried forward to the next account.

The Directors, after a careful survey of the condition of the original retort-house, found it in such a dilapidated state that it was desirable to reconstruct it. This has been done, and the internal fittings are being proceeded with, and will be ready for action before next winter. When this work is completed, the productive power of the Company will exceed one million cubic feet of gas per diem.

The demand for gas is steadily increasing, and, in order to meet the requirements of the town, further extensions must be made in the working plant, the most important of which is additional storeage capacity; and the Directors have accepted tenders for the erection of a new wrought-iron tank, and a gasholder to contain 700,000 cubic feet. This will involve the necessity of calling up fresh capital. The condensing and other apparatus will also require to be increased.

An increase in the assessment of the Company to the poor and local rates has been made by the Assessment Committee, to the extent of £2016 15s.

The following Directors go out of office by rotation, but are eligible for re-election—viz., William Bunn, Esq., Samuel Alexander Maw, Esq., and Sterling Westhorp, Esq., Mr. William Bantoft, one of the Auditors of the Company, goes out of office by rotation but is eligible for re-election.

The Chairman moved that the report be adopted. He congratulated the Proprietors that the reduction in the price of gas, made last year, had not affected the revenue, the increased consumption having quite met the reduction. With regard to the future, the very large increase in the consumption of gas would compel them to extend their buildings. There was no doubt that during the past winter there had been a considerable difficulty in getting the quantity of gas required. The Company had ample manufacturing power, but not sufficient storeage, so that in the

short days, although they could make the gas fast enough, they could not send it quickly into the town, and no doubt the consumers suffered to a certain extent. They were now about to erect another large gasholder, which he hoped would entirely remedy that difficulty, and prevent complaints which had been, he thought, properly made, that gas could not be obtained fast enough. The Assessment Committee had very largely increased their rating, which would affect them to a considerable extent—£300 a year in this rating.

Mr. G. S. CLARKE said the town generally would be benefited by this, so it must be looked upon as a reduction in the price of gas.

The CHAIRMAN, in answer to questions, said the consumption of gas had been 200,000 feet per day beyond their power of storeage. The large gasholder was already telescoped, and its capacity could not be further increased in this way. Considering the very large use now made of gas at factories and other places, both by day and by night, there was no doubt the consumption would continue largely to increase, and it was not at all too soon to add another holder.

Mr. G. S. CLARKE said he was informed last year that a large item for renewing and fixing meters was due to an exceptional year. He presumed, as the item was still a large one, that the Company had had another exceptional year.

The SECRETARY (Mr. E. Goddard) said there had been a revision of the meters on hire fixed by the Company throughout the town. They had been taken down and examined, and sent to London to be re-stamped under the Exchequer standard. That had cost a large sum.

Mr. S. WESTHORP seconded the motion for the adoption of the report, and, referring to the increased assessment, he said it was true that all fared alike; but, considering the use made of assessments, some care ought to be taken as to putting all properties up as they had been.

In reply to a SHAREHOLDER, who complained of what he called the low quality of the gas, and the inefficient supply,

Mr. GODDARD said there had been a largely increased consumption, arising mainly from gas being burned in the daytime. As to the increase in the quantity used by private consumers, they had ample opportunity of testing, not only their meters, but the illuminating power of the gas. The gas had been officially tested regularly up to the time of Mr. Wiggin's death, and been found equal to the parliamentary standard, and frequently 1 or 1½ candles above it. Very often the want of light in private houses arose from defective burners rather than defective gas, and he had sometimes convinced persons of this by changing a burner. He was quite satisfied that the gas had been quite up to the standard. A large amount of cannel coal was used last year, and both at the register in the works and at the town testing establishment, it had been found to be up to the standard. The testing establishment was as much under the control of the Consumers as of the Company, and if any one doubted the accuracy of his meter, there was an official appointed expressly to test meters under the Exchequer standard, and stamp them if registering correctly. The Company had been compelled—from applications made to them, and from the increased consumption—to increase the pressure, and this might account, in some cases, for burners consuming more gas.

After some further conversation,

The CHAIRMAN said he was quite sure that the result of the discussion would be that the attention of the staff would be given to the points alluded to.

The report was then adopted.

The CHAIRMAN proposed the declaration of a dividend of 10 per cent. on shares class A, and 7½ per cent. on shares class B and class C.

Mr. W. B. JEFFRIES seconded the motion, which was agreed to.

Mr. Wm. Bunn, Mr. S. A. Maw, and Mr. S. Westhorp, were then re-elected Directors, and Mr. Wm. Bantoft, Auditor.

On the motion of Mr. H. BECK, seconded by Mr. PRIOR, a vote of thanks was accorded to the Chairman.

Mr. GODDARD said during the present season the works had been driven to their utmost capability. They had hoped to have the new retort-house at work before the winter, but certain things prevented that, and they were taxed to their utmost to provide for the requirements of the town. He was sorry that there should have been any cause of complaint, but circumstances would occasionally arise which could not be controlled, and he could only say that he would endeavour, as far as was in his power, to remedy any defect.

On the motion of Mr. ACFIELD, a vote of thanks was accorded to the Secretary and Engineer (Mr. Goddard), and the meeting terminated.

REDHILL GAS COMPANY.

The Nineteenth Annual Meeting of this Company was held on Friday, the 21st ult.—Mr. W. B. WATERLOW in the chair—when the following report was presented:—

The nineteenth annual balance-sheet and a statement of the revenue and capital accounts of the Company for the year ending the 31st of December last, are herewith submitted to the Shareholders.

The rapid development of the business of the Company during the past year has, in the opinion of your Directors, fully justified the propriety of the extensions and improvements recently effected in the plant and machinery. Since the issue of the last annual report, the new purifying-house and tar and ammonia stores have been completed, and are found to assist materially in economizing the cost of the production of gas, to which important end your Directors are devoting their earnest attention.

The works referred to by your Directors in their last report as about to be undertaken for the supply of the public lamps in the Garlands and Cromwell Roads, have been completed; and a contract has been entered into with the Town Council for the supply of the whole of the public lamps in this Company's district for a term of three years, from Aug. 17, 1878.

Numerous applications for new private supplies, involving in some cases extensions of the mains of the Company, having been made during the past year, your Directors have deemed it desirable, in order to meet the increasing demand for public and private lights, to remove portions of the existing mains, and to lay others of increased capacity in lieu thereof.

With a view to provide additional storeage for gas, and increased facilities for the conduct of your business, your Directors have purchased a plot of land, with eight cottages thereon, immediately adjoining the works of the Company. This property will, it is anticipated, meet all the requirements of the Company for many years to come, and will provide also suitable accommodation for the workmen. The purchase-money, amounting to the sum of £3000, has been provided, to the extent of £1250, by means of a loan, carrying interest at the rate of 4½ per cent. per annum, and the residue by the temporary appropriation of the guarantee-fund.

The issue of new shares resolved on at your last annual meeting has been made *pro rata* amongst the Shareholders, and a call of £1 per share paid thereon, producing a sum of £1200. This amount has been expended in additions to, and improvements in the plant and works. The further calls payable on these shares will produce a sum of £4800, and suffice to meet the immediate capital requirements of the Company. As further capital is from time to time required, your Directors propose to issue the remaining unallotted shares.

The balance-sheet shows a net profit of £3151 2s., out of which the Directors recommend that a dividend, free of income-tax, be declared on the paid-up capital of the Company of 10 per cent., with the addition of a bonus of 1 per cent. upon so much of such capital as was subscribed prior to Jan. 1, 1875, towards making up the deficiency in the dividend paid thereon below the statutable rate in antecedent years. An interim dividend of 4 per cent. was paid in September last, leaving 6 per cent., in addition to the before-mentioned bonus, to be paid on the 1st of March next, and a balance of £310 17s. 4d. to be carried forward.

Taking into consideration the increased consumption of gas, and the favourable results of the working of the business of the Company during the past year, your Directors have resolved to reduce the price from 5s. to 4s. 6d. per 1000 feet, in the parish of Reigate, and from 5s. 6d. to 5s. in the outlying portions of their district, such reduction to date from the 25th of March next.

The retiring Directors are Messrs. W. Gritton, E. Lambert, and R. Field, who are eligible, and offer themselves for re-election.

Dr.—*Revenue Account for the Year ended Dec. 31, 1878.*

To Balance from last account		£2,576	6 0
Less dividends paid		2,385	16 6
		£190	9 6
Gas supplied		6,617	9 4
Coke, tar, lime, &c.		1,363	19 6
Services		95	18 1
Transfer fees		2	18 1
Old materials sold		22	9 8
Rent from cottages		7	15 0
Stocks on hand—			
Coals		535	0 0
Coke		21	3 0
Fittings		41	6 6
		£8,899	8 8

Cr.—*Revenue Account.*

By Stock on hand, Dec. 31, 1877		£479	18 4
Coals		2,556	4 1
Lime		91	8 6
Salaries		336	10 0
Renewals		210	0 6
Wages and petty expenses		777	1 8
Tubes, fittings, &c.		79	14 3
Rates and taxes		160	10 9
Stationery		45	1 1
Auditors fees		16	16 0
Directors remuneration		240	0 0
Interest		5	1 6
Amounts written off—		£5,448	6 8
Works, buildings, and meters, for depreciation		300	0 0
Balance		3,151	2 0
		£8,899	8 8

The CHAIRMAN congratulated the Shareholders on the increased prosperity and satisfactory position of the Company, notwithstanding the great depression of trade and commercial transactions generally, which had existed for so long a period. With regard to the important, but not very novel electric light, he expressed himself perfectly satisfied with his investment in gas shares. He concluded by moving the adoption of the report and balance-sheet, and the declaration of the dividend and bonuses, as recommended in the report.

The resolution having been carried, the retiring Directors were re-elected, as was also the retiring Auditor, and £330 was voted the Directors for their services during the past year.

The usual votes of thanks terminated the proceedings.

WOLVERHAMPTON GAS COMPANY.

The Half-Yearly General Meeting of this Company was held on Tuesday, the 25th ult.—Mr. J. UNDERHILL in the chair.

The SECRETARY (Mr. A. Jones) read the notice convening the meeting, and the following report of the Directors:—

The Directors have much pleasure in meeting you, and submitting their fifty-fourth half-yearly report and statement of accounts, duly certified by your Auditor, from which it will be seen that the total receipts are £26,431 8s. 3d., and the expenditure £19,964 0s. 3d., leaving a balance of £6467 8s., which, added to the balance of last account, amounts to £3302 18s. 3d. This enables your Directors to recommend the usual dividend of 5 per cent. upon the consolidated stock, and 3 per cent. (less income-tax) upon the paid-up capital of the preference shares. They also propose carrying £600 to the reserve-fund, leaving a balance to be carried to the current half year. Both the dividends are payable forthwith, if approved by the meeting.

The usual repairs, alterations, and improvements of the works and plant have been carried out, together with the erection of large scrubbers at your Stafford Road station, which are now completed, and at work.

Three of your Directors retire by rotation at this meeting—namely, Mr. H. Ward, Mr. G. L. Underhill, and Mr. Samuel Loveridge—and offer themselves for re-election. Your Auditor, Mr. Lawley T. Smith, also retires, and offers himself for re-election.

In conclusion, your Directors beg to assure you that they will continue to use their best efforts for the promotion of the interests confided to their care.

The CHAIRMAN, in moving the adoption of the report, remarked that, notwithstanding the unprecedented depression in trade, the Company had done as well as usual, and, in some cases, better. The balance to be carried forward was not so large as that at the corresponding meeting last year; but this was due to two or three circumstances which he would name. Owing to the great depression that had prevailed in the coal and iron trades, they had not been able to dispose of their coke so satisfactorily as in former years. As was only to have been expected, their bad debts were much larger than last year, though in regard to gas itself they were not very conspicuous. They would remember that when they met last year he told them that the Directors had decided to reduce the price of gas to 2s. 6d. per 1000 feet. That had now been done, and he believed that, with only three or four exceptions, it was a lower price than any other Company were charging. In fact, taking the quality of the gas supplied into consideration, he might say that the price at which they sold it was the lowest in the kingdom. Of course, this reduction in price had naturally reduced the amount of their revenue, and that was another cause for their having a smaller balance to carry forward. He might mention that during the past six months the Directors had had a number of alterations and improvements carried out at the works, the completion of which would enable them to supply the public with as much gas as they could possibly require. The quality of the gas had also been kept up, and he might say that during the half year there had been a much smaller number of complaints than usual. In fact, considering the very inclement weather that had lately prevailed, the only wonder was that these complaints had not been much more numerous. The Directors had also invested a considerable sum of money in the purchase of some patent scrubbers, by means of which they hoped to very considerably improve the quality of the gas. He had no doubt also that the operation of these scrubbers would enable them to make a considerable addition to the residual products of gas-making, which, as they were aware, formed a very important item in their profits. Referring to the electric light "scare," he said that, in consequence of the heavy cost of the new light, and the uncertainty of its action, he was sure it would not come into use for private houses, or generally for small consumption. It might do for such purposes as lighthouses, and the illumination of public squares, where an intense and brilliant light was required, but for the present he did not consider it was at all likely ever to take the place of gas as a means of lighting small towns and villages, shops, and the ordinary class of manufactories and places of business. Therefore, he thought the Shareholders need not be under any fear that the electric light would depreciate the value of their property to any extent. All who had thoroughly inquired into the matter were satisfied that gas would continue to maintain its place as a general illuminant, in spite of any improvements that might be made in the electric light. But, in addition to this, there

were a vast number of ways in which gas might be made economically useful, to which it had not yet been applied, but to which it might be adapted in future. He referred particularly to the use of gas for cooking, for warming houses, and for various other purposes. With respect to the price of their gas, the rate to which they had now reduced it was, they considered, as low as they ought to sell it at, and for the future the exertions of the Directors would be more especially directed to improving the quality of the gas, so that it might ultimately become, not only the cheapest, but the best gas supplied by any Company in the kingdom.

Mr. OWEN seconded the motion.

Mr. J. CREMONINI said he had much pleasure in supporting the motion, and he would say besides that he had the most implicit confidence in the stability of the undertaking. As to the electric light, he agreed with the Chairman, that the expense of introducing it was too great for it to be adopted on any general scale in the place of gas, especially when compared with the low price at which gas was being sold in that town. With respect to the revenue of the Company from meter-rents, he wished to make this suggestion, that if it were practicable for the Directors to reduce their present charge, it would, he thought, very much facilitate an increase of their customers among the smaller class of householders, who were at present, to some extent, deterred from having gas laid on by the meter charge of 1s. per quarter. There was another point he should like to refer to, and that was the large amount of money which appeared to be still outstanding, which was set down at £20,000. He would urge upon the Directors not to be too lenient in giving their customers much credit, especially at a time like this, as it might lead to very heavy loss.

The CHAIRMAN said, with regard to the remarks of Mr. Cremonini as to the charge for meters, he could only say that the sole object of himself and his colleagues was, after securing the dividends for the Shareholders, to let the consumers have the benefit of the surplus profit in every possible way—first, by giving to them an improved quality of gas; and, next, by reducing the price; and, if they could see their way to make any abatement in the rent now charged for the meters, he could assure Mr. Cremonini they would not hesitate to do so. With regard to the amount of their outstanding accounts, he would remind Mr. Cremonini that their books were balanced up to the 31st of December. Their heaviest quarter ended on that date, and they could not commence sending out their accounts until some time after the beginning of the new year. The £20,000 to which Mr. Cremonini referred would include, he should say, between £13,000 and £14,000 for gas consumed during that quarter, no part of which had been collected when the books were made up. The remaining £6000 would be money due for coke principally, and other odd matters. He could assure Mr. Cremonini that the accounts were looked after very closely, and that no more latitude was allowed than was reasonable.

The motion for the adoption of the report was then put and carried; and, on the motion of the CHAIRMAN, the dividends recommended were declared.

The three retiring Directors were re-elected, and Mr. Lawley T. Smith was re-appointed Auditor.

Mr. CREMONINI moved a vote of thanks to the Chairman and the Board of Directors for their services during the past half year.

The motion was put and carried.

The CHAIRMAN, after briefly acknowledging the vote, assured all present that the Directors would in the future, as they had in the past, use their best endeavours to promote the interests of the Shareholders, and at the same time also the interests of their numerous consumers.

On the motion of the CHAIRMAN, seconded by Mr. H. LOVERIDGE, a vote of thanks was passed to the Officers of the Company, who were highly eulogized for their services, and the compliment was acknowledged by the MANAGER (Mr. J. Annan).

The proceedings then terminated.

SOUTH HANTS WATER-WORKS COMPANY.

The Annual Meeting of this Company was held at the Office, King's Arms Yard, London, on Friday, the 21st ult.—Mr. CREW in the chair.

The report stated that the works had been proceeded with by the Contractors with great diligence, and they were now practically so near completion that the Company were in a position to supply water, and had begun to lay on house services. An extension of the Company's mains in the direction of Eling and Totton having been deemed desirable, a further contract had been entered into for such works. The Directors having been originally appointed under the provisions of the Act by which the Company was incorporated, now desired to place themselves in the hands of the Shareholders, but they were willing to continue to act. The Auditors of the Company, Messrs. John James Burnett and William Edmonds, also offered themselves for re-election.

The CHAIRMAN, in moving the adoption of the report, said the works were now completed, and the Contractors had handed them over to the Company. Already they were supplying certain houses in parts of their districts—namely, at Romsey, Freemantle, and Shirley—and although they had only been laying on services for about a week or ten days, they had orders on hand that would bring them in £40 annually. In addition to that, they were in communication with owners of building estates in the neighbourhood of Southampton, for supplying water. One estate was about 10 acres in extent, and the other would be cut up into 300 plots, which meant that about 300 houses would require supplies. That, he considered, was a very favourable sign for the future of the Company. The Public Health (Water) Act, passed last session, which would come into force on the 25th of March, provided that any person who wanted to build or occupy a house must obtain the sanction of the sanitary authority that there was a proper supply of water. That clause would be very beneficial to the Company. They were now extending their works to Eling and Totton, and already they could see the prospect of a very fair percentage for the outlay to which they had been put, even from the wholesale customers alone. Altogether, he thought the matter promised very well. The works were opened on the 31st of January, when they had a very successful inauguration at Romsey. Many of the Sanitary Authorities, besides the County Members, attended, and all of them looked upon the scheme with considerable satisfaction. All the Medical Officers were also in favour of the works, and he thought it would be of material advantage to the district; therefore he had much pleasure in moving the adoption of the report.

Lord EDWARD SPENCER CHURCHILL seconded the motion, which was carried unanimously.

Mr. J. EASTON moved the re-appointment of the present Directors. He said he believed the Shareholders could not do better than again entrust their interests in the hands of those gentlemen. He would, however, move an addition to the number, in the person of Mr. George Henry Ogston, a scientific gentleman, whose assistance would prove an advantage to the Company. In these days, when disease was often propagated by means of water, and when still more frequently Companies were accused of spreading that disease in consequence of supplying impure water, he thought it would be best to have on the Board a gentleman like Mr. Ogston, who, an analytical chemist himself, had made water a chief study.

Mr. J. GOODSON having seconded the proposition, it was carried unanimously.

Mr. EASTON then proposed that the Shareholders should place at the disposal of the Board of Directors the sum of £100 a year, and suggested that there should be a Resident Director. During the last twelve months, Mr. Crew, who lived in the centre of the best part of the Company's district, had acted as Managing Director. He did not know whether he was disposed to continue as such, but he was sure it would be to the interest of the Company if he did so; and he moved that, in addition to the £100 for the general Directors, a separate stipend of £50 should be given to Mr. Crew for his services as Managing Director.

Mr. BURNETT, in seconding the motion, said he had worked with Mr. Crew in other Companies, and was quite sure that, with that gentleman at the head of affairs in the district, the Company would be a complete success.

The resolution having been carried,

The CHAIRMAN returned thanks, and

Mr. OGSTON, in thanking the meeting for appointing him a Director, said he believed his knowledge of water would be of use to the Company. He was quite satisfied as to the excellence of the quality of the water they supplied, and had no doubt of their ultimate success.

Mr. EASTON then moved, and Mr. FOGG seconded, the re-appointment of the Auditors.

Mr. AMOS thought that the amount paid to the Auditors was too much for the amount of work to be done, and in comparison with what was paid by other companies.

The SECRETARY, however, pointed out that in water companies books the items were small, but exceedingly numerous, and the amount of labour the auditing of them involved was very great.

The motion was carried *nem. con.*, and the proceedings terminated with votes of thanks to the Chairman and Directors.

READING GAS COMPANY.

The Half-Yearly Meeting of this Company was held on Monday, the 24th ult., when the following report was presented:—

The Directors have the pleasure to submit the statement of accounts for the half year ended the 31st of December last, and to recommend that the full usual dividends be paid on the various stocks and shares of the Company, such payment to be made on the 1st of March next.

Your Directors have the satisfaction to report that the business of the Company has been conducted, and has progressed entirely to their satisfaction. The make of gas per ton of coals has been greater, and the percentage of loss by waste, condensation, &c., less than has ever been previously recorded. Your Directors feel that this satisfactory state of things has been due to the care and management of Mr. Baker, their Engineer, and is the result of a careful selection of coals, attention to details of manufacture, and constant supervision of mains and fittings. The reports of the Gas Analyst as to illuminating power and purity of the gas supplied have also been quite satisfactory.

Your Directors have also the pleasure to state that they intend to still further reduce the price of gas, which will be announced in due course.

Your Directors also foreshadow that, owing to the great increase in the Company's business, a considerable addition to plant and premises must, before long, be made.

Great alarm was created a few months ago in the minds of some shareholders in gas companies by the announcement of important discoveries in lighting by electricity, which, it was asserted, would compete with, and in some, if not all cases supersede coal gas. Your Directors think that it has been demonstrated that gas has nothing to fear in the competition, the electric light being much more expensive to produce, difficult to manage, subdivide, and measure.

The Directors retiring by rotation are Messrs. Cooper and Taylor, and Sir Peter Spokes. These gentlemen are eligible, and offer themselves for re-election. The retiring Auditor is Mr. W. B. Williams. The Directors regret that, owing to his other engagements, Mr. Williams, after efficient service as Auditor for 17 years, has found it necessary not to seek re-election. Mr. Charles Morris, of the firm of Messrs. Charles Cocks and Co., a duly qualified Shareholder, has consented to be nominated for the office.

Dr.—*Revenue Account, for the Half Year ended Dec. 31, 1878.*

To Manufacture of gas—			
Coals delivered	£6,326 12 3		
Purifying materials	68 2 6		
Salaries, &c.	270 0 0		
Wages	1,391 2 11		
Repairs and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, and labour	1,003 18 2		
		£9,059	15 10
Distribution of gas—			
Salaries of Inspectors and Assistant-Inspectors	£50 2 0		
Repair, maintenance, and renewal of mains and service-pipes, including materials, laying and paving, and labour	1,049 19 8		
Repairing, renewing, and refixing meters	432 2 3		
		1,532	3 11
Public lamps—			
Lighting, &c.		233	12 5
Rates and taxes		556	0 7
Management—			
Directors allowances	£125 0 0		
Salary of Secretary and for offices	125 0 0		
Collector's commission	285 5 11		
Stationery, printing, &c.	75 4 8		
General establishment charges and incidentals	182 16 2		
Auditors fees	6 6 0		
		799	12 9
Contingency-fund		390	0 0
Bad debts		48	5 9
Total expenditure		£12,619	11 3
Balance carried to profit and loss account		3,959	10 4
		£16,579	1 7

Cr.—*Revenue Account.*

By Sale of gas—			
Private consumers	£12,366 7 2		
Public lighting and under contracts	908 6 3		
		£13,274	13 5
Residual products—			
Coke, less labour	£2,072 0 2		
Breeze	15 6 0		
Tar	616 16 10		
Ammoniacal liquor	497 10 2		
		3,201	13 2
Rents		8	5 8
Reserve-fund—dividends received		94	9 4
		£16,579	1 7

In accordance with the intimation contained in the above report, the Directors have since given notice to the Consumers that, as from Dec. 31 last, the price of gas has been reduced as follows:—When the consumption shall not exceed 20,000 cubic feet per half-year, from 4s. to 3s. 9d. per 1000 feet; over 20,000 and not exceeding 40,000, from 3s. 10d. to 3s. 7d. per 1000 feet; over 40,000, from 3s. 7d. to 3s. 4d. per 1000 feet; 1s. per 1000 feet extra for gas supplied beyond the boundaries of the borough. No charge is made for use of meters unless the consumption is under 2000 feet. This makes the second reduction of 3d. per 1000 feet within the past twelve months. The average price of gas supplied in Reading is now 3s. 3d. per 1000 feet.

PETERBOROUGH GAS COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held on Tuesday, the 18th ult., when the following report was presented:—

The Directors herewith submit to the Shareholders the balance-sheet and statement of accounts for the half year ending Dec. 31, 1878, which exhibit results more satisfactory than those of any previous half year.

The balance of the profit and loss account, including £105 4s. brought forward from the last half year's account, is £2907 4s. 8d. Out of this sum, after providing for the payment of the preferential dividend on the 5 per cent new preference A shares, the Directors recommend the payment of the maximum dividend for the half year on the remaining share capital of the Company, and a back dividend at the rate of 2 per cent. per annum, or 4s. per share, on the ordinary shares, and 1 per cent. per annum, or 2s. per share, on the new ordinary shares of the Company, for the year ending Sept. 30, 1871, free from income-tax, and that the balance then remaining, amounting to £257 19s. 8d., be carried forward to the next half year's account.

The manufacture of sulphate of ammonia has been commenced during the half year, with results which justify your Directors in having adopted this branch of business.

Whilst congratulating the Shareholders on the substantial and efficient condition of their works and plant, and the continued prosperity of the Company, the Directors have to state that their attention has been drawn to the necessity of enlarging the purifying plant before another winter. This will involve a further outlay, in order to meet which another call on the last issue of shares will shortly be made.

The Directors beg to annex a copy of the Auditor's report:—

"*Peterborough, Feb.* 4, 1879.

"Dear Sir,—We send you herewith the balance-sheet of the Gas Company, certified. We are happy to say, for your own information and that of the Directors, that, having found the accounts correct, we have nothing specially to report upon, and remain, your obedient servants,

"J. F. Arnold,
"F. G. Buckle.

"G. E. Stevenson, Esq., Engineer and Manager, Gas-Works, Peterborough."

Dr.—*Revenue Account.*

To Stock in hand on June 30, 1878				£67	7 11
Gas manufacture, viz.:—					
Coals, including cartage	£1869	2	2		
Purifying materials	25	15	4		
Cartage of coke and tar	8	12	5		
Wages	501	7	2		
Sundries	18	1	3		
				£2,422	18 2
Repairs and maintenance, viz.:—					
Repairs to mains, service-pipes, and lamps	£107	16	6		
Repairs and renewals of retorts	54	0	10		
Repairs of works (general)	174	4	2		
Repairs and inspection of meters	38	7	5		
				374	8 11
Sundry charges, &c., viz.:—					
Chemicals, &c., for manufacturing sulphate of ammonia	£207	14	8		
Rates and taxes	205	12	2		
Salaries	320	0	0		
Stationery, printing, and advertising	28	9	8		
Law charges	4	4	0		
Incidental expenses	29	14	3		
Gas-fittings	40	14	7		
Audit of accounts	10	10	0		
Directors remuneration	200	0	0		
				£1,046	19 4
Interest, &c., viz.:—					
Interest on mortgage	£142	0	6		
Bankers	45	7	10		
				187	8 4
Bad debts				18	19 6
Balance				2,802	0 8
				£6,920	2 10

Cr.—*Revenue Account.*

By Sale of gas			£5,409	3 7
Meter-rents			106	10 6
Coke			489	1 0
Tar			212	17 1
Sulphate of ammonia			376	7 0
Sundries			26	5 7
Gas-fittings			67	6 2
Stock in hand, viz.:—				
Coke	£52	10 0		
Tar	36	0 0		
Ammoniacal liquor	121	0 0		
Gas-fittings	23	1 11		
			232	11 11
			£6,920	2 10

Coal carbonized in half year	2,495 tons.	
Gas made during half year	26,646,300 cubic feet.	
Gas made per ton of coal	10,680	"
Gas sold during half year	24,033,675	"
Gas sold per ton of coal	9,650	"

CITY OF ST. PETERSBURG NEW WATER-WORKS COMPANY, LIMITED.

The Sixth Ordinary General Meeting of the Shareholders in this Company was held on Wednesday, the 26th ult., at the City Terminus Hotel, London—Mr. W. T. Western in the chair.

The report of the Directors stated that the receipts of the Company from sales of water during the six months ending the 31st of December last had been 36,737 roubles, as against 50,434 roubles for the preceding twelve months. The number of services supplying was 464, of which 286 were by fixed rate, and 178 by meter. These, together with a few services laid, but not at present used, made an increase of 75 during the half year. The cost of a small extension of mains, and other slight additions to the works, had been charged to capital account.

The Chairman, in moving—"That the report and accounts now presented be received and adopted," said at their last meeting it was arranged that the Company should hold their meetings in February instead of in August, and, therefore, they now presented the Shareholders with six months accounts instead of twelve. The progress of their works during the six months had been comparatively satisfactory, but he said comparatively, because the figures were still very small—nothing like what they hoped to attain to. The receipts from water-rates—which, of course, was their main source of income—showed an increase of 50 per cent., and the increase from sale-houses and street-watering had been at the rate of about 30 per cent. The profit on house-services and meters sold and leased was not quite so large as in the preceding year; but he thought they would agree that it was fairly satisfactory. They had done their best, as they promised, to keep down the expenses, and in almost all the items of the account they would see a diminution—in salaries, rent, and outdoor work—and they had bought coals somewhat cheaper than in the preceding year; but they had used rather a larger quantity. In the Engineers department there was a small increase; repairs were about the same. In fuel for, and repairs of sale-houses there was a diminution, and fire insurance was about the same as in the preceding year; but the charge for the whole year fell on the present accounts. In the item of stores used there was a very considerable diminution. The result was that they had made a nominal profit during the half year of about 13,000 roubles, as against a profit in the preceding year of 200 roubles. He hoped they would agree with him in considering this satisfactory. In the profit and loss account they found that the nominal profit of £1700, or 13,000 roubles was reduced by the very heavy loss on exchange—about £500. They had written down the value of their assets at St. Petersburg to correspond with the fall in the exchange. The London expenses were approximately the same as in the preceding half year. There was not much economy which they could exercise in that item now. The debenture interest, of course, was rather larger than in the preceding year, on account of the amount which they had issued during the last year. The net result of the account was a total loss of £2600, which, of course, was not satisfactory; but this loss was after debiting the whole amount of the interest and every farthing of liability which the Company owed. That was the amount they had to make up before they could begin to pay any dividend on the shares. As to the increase in their revenue from street-watering and outdoor sales, he ought to explain that the second half of the year was always the better, as more water was used for washing the streets. They owed something under that head, as the pressure put on the public by the police regulations of the town—the cleaning of the streets and washing the pavements, &c.—had been enforced much more rigorously than before, and had entailed a larger consumption of water, which meant a slightly increased revenue to the Company. The most unsatisfactory part of the accounts was the further depreciation of the exchange. The rate at present was barely 23d., and the average during the half year had been under that. He need not tell them that this was a most serious loss to them, amounting to a tax of about 30 per cent. on their gross revenue. It was a loss they were utterly unable to avoid, and they could only hope for, even if they did not expect some improvement. Things, however, were looking better in that respect now. With regard to the maintenance of their works, which was a matter of very serious interest to the Company, he had nothing to say which was not satisfactory. They had had no loss or damage from frost—the danger they had to face two years ago—nor had he heard of any stoppage for that reason. They had had comparatively few leakages, and there had been nothing whatever of any serious importance to repair. The winter, which was their great enemy there, had hitherto been very mild indeed, taking the average of the winters. They had heard a great deal about the plague in the south of Russia; but there was none whatever in St. Petersburg itself, and none within many hundreds of miles of the place. The Authorities, however, were taking precautions against any possible outbreak of such a calamity taking place. When he was there, a Government Commission was sitting to take steps for the prevention of any outbreak, and the point which was of interest to the Shareholders was that, among other recommendations which it was understood they had agreed to make, they should impress seriously upon the inhabitants the necessity of taking a greater supply of water, and particularly of Neva water. The Company had the privilege of supplying the Neva water to a considerable part of the town, and they hoped this might be of some good to them. When there, he consulted with their local Manager and Director as to the steps they were to take in this matter, particularly with the view of minimizing the difficulty, which some people assumed they had, of bearing the first expense of laying the water on to the houses; and he had recommended strongly that they should take the smallest possible sum not leaving them with any loss, and look for their profit on the sale of water hereafter. If that were carried out, it might entail some diminution under the head of house profit and meters sold, but he thought it would be for the ultimate benefit of the Company. With regard to their finances, they had had, as the Shareholders were most probably aware, to raise further funds to keep down the current liability on their debentures. The profit they derived from working the business at St. Petersburg enabled them to provide about one-third of the sum required, and a further sum was provided by the Directors and some of their friends, and no appeal was made to the Shareholders generally. The difference was made up by some of the large Debenture-holders agreeing to fund the interest due to them, and the balance was still owing to a gentleman who had a very considerable share in the concern, and who, though he would not promise to fund, said he would wait to see what the half year's accounts were, and would, at any rate, hold it over for a considerable time, for which they were very much indebted. He was sorry to say that on that point a clerical error had crept into the accounts. The balance-sheet said that a certain amount of debenture interest was due "and agreed to be funded;" but they would strike out these words, and take his explanation instead. With regard to their prospects, he did not like prophesying, but he did say that the accounts now before them showed a very handsome proportionate increase of revenue; and he thought that in the current year, as far as one could judge from contracts promised, and from the increased consumption going on in the houses which had taken it, they ought to be able to add, as nearly as possible, the amount that they had added during the past year. This would give them for the present year something like half—perhaps half of the amount necessary to pay their debenture interest. They would still have to provide the remaining half, and he hoped the Shareholders would help them. They found that every new house which was being built in the place was taking the water, and a very considerable number of new houses were in course of erection; but they got on very slowly with the middle-class and the shops. They found—and this was very satisfactory—that every house which had once taken the water never gave it up, and only in one case had they had to cut off the supply to compel payment, and then they were entreated to lay it on again as soon as possible. At the beginning he advocated the most liberal terms to the consumers. Many objected to the meters, and preferred taking the water at a lump sum—paying an estimated amount, and they made such contracts with those persons. These were now, however, running out, and they believed that in every case they would afterwards be able to claim a higher rate than hitherto.

Mr. A. W. Young, M.P., in seconding the motion, said the Company derived considerable benefit from the Chairman's occasional visit to the scene of their operations. It was, however, a somewhat expensive affair, borne hitherto by that gentleman himself; but he trusted they would soon be able to pay him his actual expenses, at all events. Although they were deeply sensible that the undertaking required very much longer to develop than he thought, still he could not help being pleased that it was now showing an amount of activity which it had not hitherto exhibited. Now that the war was over, he thought the water would more quickly come into use. He hoped the Shareholders would, to some extent, assist the Directors in the matter of the debenture interest.

The report was then unanimously adopted, and the retiring Directors—Mr. Wm. Sangster and Mr. Western—were re-elected.

The Chairman, in returning thanks, promised to do his utmost for the Company.

Mr. Sangster, in the course of his reply, said the Chairman had not given quite so sanguine a description of their gains as he might have done. He (Mr. Sangster) could assure them, from what he had seen during the past two or three years, that it was only a question of time, and a very short time, when they would be able to pay not only all their debts, but also the Bondholders and Shareholders.

The Auditors—Messrs. Cooper Brothers and Co., and Mr. Whishaw—were re-elected, and the proceedings terminated with a vote of thanks to the Chairman and Directors.

BLACKBURN CORPORATION GAS-WORKS.

The following are the annual report and working statement for the year ending Dec. 31, 1878, of the Blackburn Corporation Gas-Works—prepared by the Engineer and Manager, Mr. S. R. Ogden:—

To the Chairman and Members of the Gas Committee.

Gentlemen,—I have again the honour to lay before you the annual statement of the operations of your gas-works for the year ending Dec. 31, 1878, and I feel sure you will find the same satisfactory.

You will be pleased to learn that the No. 2 works continue in good working order, and, consequently, will require little money being expended upon them during the ensuing year.

As far as regards the No. 1 works, however, some outlay will be required, as certain necessary extensive alterations will have to be effected for the better purification of the gas; but the total cost will probably not exceed £10,000.

In conclusion, permit me to draw your attention to the accompanying working statement; and, satisfactory as it is, it would even have been more so had the staple trade of the town and district not been in such a very depressed condition for many months.

(Signed) S. R. Ogden, Engineer and Manager.

Working Statement for the Year ending Dec. 31, 1878.

Gas made, as per station-meter		316,116,000 cubic feet.
Gas sold to private consumers	265,118,100 cubic feet.	
Gas sold for public lighting	17,842,500 ,,	
Gas used on the works	2,319,400 ,,	
		285,280,000 ,,
Unaccounted for		30,836,000 cubic feet.
	Or 9·7 per cent.	

Capital employed—	
Share capital	£238,035 0 0
Loan ditto	96,494 10 0
Total	£334,529 10 0, or £11 9s. 6½d. per ton, or £1 3s. 7½d. per 1000 feet sold.

Coal carbonized—		
Common	22,144 tons	= 75·96 per cent.
Cannel	7,005 ,,	= 24·04 ,,
	29,149 tons.	

Illuminating power required by Act	16 candles.
Illuminating power supplied	18 ,,
Gas made	316,116,000 cubic feet.
Gas made per ton	10,844 ,,
Gas sold	282,960,600 ,,
Gas sold per ton	9,707 ,,
Gas sold, per cent. on make	89·5 per cent.
Used at works and offices	2,319,400 cubic feet.
Used at works and offices, per cent. on make	·73 per cent.
Gas unaccounted for	30,836,000 cubic feet.
Gas unaccounted for, per cent. on make	9·7 per cent.
Coke made	21,400 tons.
Coke used for fuel	9,640 ,,
Coke used for fuel, per cent. on make	45 per cent.
Average price of coke sold	5s. 6d. per ton.
Tar made, 1640 tons = at 200 gallons per ton	328,000 gallons.
Tar made per ton of coals	11·25 ,,
Average price of tar per gallon	2¼d.
Liquor made, 2679 tons = at 230 gallons per ton	616,170 gallons.
Liquor made per ton of coals	21 ,,
Average price of liquor per 1000 gallons	50s. 9½d.
Net proceeds of coke and other residuals, per cent. on cost of coal	39·96 per cent.

—	—	—	Cost per 1000 Cubic Feet Sold.		Cost per Ton of Coal Carbonized.	
	£ s. d.	£ s. d.	d.	d.	s. d.	s. d.
Coal	—	20,012 2 5	—	16·97	—	13 8·77
Less residuals—						
Coke	3,262 12 6½	—	2·76	—	2 2·86	—
Tar	3,171 7 1½	—	2·69	—	2 2·1	—
Liquor	1,564 11 8	—	1·33	—	1 0·88	—
		7,998 11 4	—	6·78	—	5 5·85
Net for coal	—	12,013 11 1	—	10·19	—	8 2·92
Purifying	420 7 1	—	0·35	—	0 3·46	—
Salaries of Engineer, Foremen, &c.	1,035 13 6	—	0·88	—	0 8·52	—
Wages at works	4,612 4 7	—	3·91	—	3 1·98	—
Repairs and maintenance of works	3,052 11 0	—	2·60	—	2 1·14	—
Salaries of Meter Inspectors	580 18 0	—	0·50	—	0 4·78	—
Repairs of mains and services	1,103 9 1	—	0·93	—	0 9·08	—
Repairing, renewing, and refixing meters	1,599 11 10	—	1·35	—	1 1·17	—
Rents	472 9 8	—	0·41	—	0 3·89	—
Rates and taxes	4,528 4 8	—	3·84	—	3 1·29	—
Directors allowances	—	—	—	—	—	—
Salaries of Secretary and Office Clerks	559 13 2	—	0·47	—	0 4·60	—
Collectors salaries	400 0 0	—	0·33	—	0 3·29	—
Stationery and printing	167 6 6	—	0·14	—	0 1·38	—
General establishment charges	490 16 5	—	0·42	—	0 4·04	—
Treasurer and Auditors fees	131 1 8	—	0·12	—	0 1·08	—
Bad debts	101 13 8½	—	0·08	—	0 0·83	—
Coal for offices, blacksmiths	240 0 0	—	0·20	—	0 1·99	—
Total working expenses	—	19,496 0 10½	—	16·53	—	13 4·52
Coal and working expenses, less residuals	—	31,509 11 11½	—	26·72	—	21 7·44
Rental	31,492 19 9	—	13·67	—	—	—
Public lighting	2,768 1 5	—	2·35	—	—	—
Total rental and lamps	—	54,261 1 2	—	46·02	—	37 2 76
Profit on gas manufacture	—	22,751 9 2½	—	19·30	—	15 7·32

Summary.

Profit on gas manufacture, as per above statement		£22,751 9 2½
Add not included in the above—		
Rental of meters	£1651 11 3½	
Rents	333 1 9	
Discounts	9 6 6½	
Sundries—receipts	615 7 0½	
Profit on meters sold	7 15 0	
		2,617 1 7½
Profit, as per balance-sheet		£25,368 10 10

The balance-sheet of the Company shows that the receipts on capital account to the end of 1878 were—On shares, £238,035; on mortgages, £96,494 10s.—total, £334,529 10s.—the whole of which had been expended. The reserve-fund on Dec. 31, 1878, amounted to £4963 4s. 10½d.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

The Ninth Annual Meeting of this Institution was held on Saturday, the 22nd ult., at the Mitre Hotel, Manchester. Mr. David Clarke, of Ashton-under-Lyne (President), occupied the chair, and there were about 34 Members present.

The minutes of the previous meeting were read and confirmed.

The following gentlemen were then unanimously elected Members of the Institution:—

Mr. William Tyrrell, Gas Manager	Droylsden.
Mr. John Clark, Gas Manager	Whittington.
Mr. William Bridge, Gas Manager	Dukinfield.

The Secretary (Mr. R. Hunter) read the report of the Committee, of which the following is a copy:—

Gentlemen,—The Committee, in presenting their Ninth Annual Report, have to congratulate the Members on the continued prosperity of the Institution. Eight new Members have been added to our numbers during the past year, which shows a very satisfactory state of affairs. Three Members, who have ceased to hold positions as Managers, retire from the Institution, in compliance with Rule 1. The net gain in numbers is five, our total now amounting to 76.

From the statement of accounts supplied to each Member, it will be seen that the funds of the Institution continue in a very satisfactory condition, the balance in hand being £12 5s. 11d.

The best thanks of the Members are due to Mr. Clarke for the very efficient manner in which he has discharged the duties of President during the year, and for the Inaugural Address delivered by him in February last; and also to the following gentlemen for their respective papers—viz., Mr. Ogden, for his paper on "Scrubbing and its Results;" Mr. Carr, for his "Notes on the Valuation of Gas-Works for Rating Purposes;" and to Mr. Saville, for his paper "On an Improved Exhauster." Considering the very limited time at the disposal of the Members for the reading and discussion of papers, the Committee congratulate them on having been favoured with so many during the past year, and they trust the Members will strive to keep up the supply of good and useful subjects for discussion.

At the quarterly meeting held in May last, the Members visited Blackpool, where they were received by Mr. Chew, and some of the Members of his Committee, and conducted by them over the gas-works. The drawings of the new works were also submitted for their inspection. Our best thanks are due to Mr. Chew and the Gas Committee for the reception accorded to the Members on that visit.

The thanks also of the Members are due to Messrs. Braddock and Chadwick, who, having completed their term of office, retire from the Committee at this meeting, in compliance with Rule 4.

Mr. Miles (Clitheroe) moved the adoption of the report, which was seconded by Mr. Smedley (Buxton), and carried unanimously.

Mr. Carr (Halifax) moved the following resolutions, of which he had given notice:—"1. That it be an instruction to the Committee to vary the place of meeting, so that at least two meetings each year shall be held out of Manchester. 2. That it be a recommendation to the Committee to fix the time of meeting at an earlier hour, to give a better opportunity for the discussion of papers." He said that his reason for moving the first resolution was twofold. At a meeting recently held in Bradford, it was proposed to form an Association for the West Riding of Yorkshire, but although he was elected Chairman of that meeting, he did not approve of the idea, because he thought the distance was so short between that place and Manchester, that it would be more advantageous for any gas managers in the West Riding to join this Institution rather than form another in Bradford. Knowing, as he did, from his experience, both as a private member and as a member of the Committee, what a vast amount of labour the working of it involved, he felt it was undesirable to multiply such Associations, and, therefore, he undertook to bring forward this resolution, which, he thought, if adopted, would meet their views, and obviate the necessity of forming another Association. He thought it was only fair that they should hold their meetings at the various places from which the Institution gathered its members, so that the attendance at the meetings should not always entail considerable expense to members living 30 or 40 miles from Manchester. In his own case, the subscription he paid was a very small sum, in comparison with his expenses in attending the meetings. There was also the inconvenience to members living in a remote part of the district, which must be considered; and on this point he might say that he believed the feeling of the Bradford meeting was, that if this Institution would occasionally hold its meetings at Leeds, Bradford, or some other part of Yorkshire, at which they could more conveniently attend, there would be no necessity to form another Association. He concluded by moving the first resolution.

Mr. Chew (Blackpool), in seconding the resolution, said that he endorsed almost everything spoken by Mr. Carr, and he thought that, as far as possible, those members who resided 30 or 40 miles from Manchester ought to reap equal benefits from the Institution with those who resided within 10 miles. Besides the saving of expense to members from a distance, he thought a change of meeting-place would afford other advantages, such as seeing each other's works, and, by interchange of opinion, gaining considerable information with regard to gas manufacture throughout the country. He did not think the Institution had done so much as it might do, by combined effort, to raise the position of gas managers. There was scarcely any district out of London where more gas was manufactured than in this district, and he thought they ought in no way to be second to London. He would like to see a greater number of papers contributed by members than there had been, for they must remember that, although they prided themselves on being an intelligent body of men, they were, after all, only a big Mutual Improvement Society. He hoped they would go on improving, and he thought the resolution was in the right direction, for effecting that object in the most economical way to every member.

Mr. Brothers (Chorley) thought Mr. Carr was advising a change of medicine without consulting the patient. He thought the Gas Companies or Corporations ought to pay the expenses of members attending the meetings, as it was really more than many of them could afford.

Mr. Braddock (Manchester) believed the resolution was one with which the Committee quite coincided.

Mr. Hunter (Stalybridge) said it was desirable to retain Manchester as the head-quarters of the Institution, and that the Annual Meetings and all Committee Meetings should be held there.

Mr. Ogden (Blackburn) was afraid that if an Association were formed in the West Riding of Yorkshire, this Institution would lose a number of its members, and, in order to prevent such a result, he would support the resolution.

Mr. Whitehead (Dronfield) stated that the expense of attending the meetings had prevented him coming on many occasions, and he thought, if an Association were formed in Yorkshire, many gas managers in Derbyshire would join.

Mr. Smedley (Buxton) supported the resolution, although, by holding the meetings in Yorkshire, it would, he said, be still more inconvenient for him to attend.

The Chairman said the feeling of the Committee was that it would be only an act of justice to the members to hold the meetings at different places, so as to suit the convenience of all.

The resolution was put to the meeting, and passed unanimously.

Mr. Carr, in moving the second resolution, said he was very much obliged to Mr. Chew for naming the advantages they would derive from a change of meeting-place, by the additional opportunities it would afford members for inspecting other works, this being one of the benefits he had intended pointing out himself when moving the first resolution. He also

agreed with the Secretary that the Annual and Committee Meetings should be held in Manchester, as he considered it the best centre they could get. He would not like it to be thought that, in mentioning the meeting at Bradford, the possibility of forming a Yorkshire Association was intended as a sort of scare or threat to this Institution. Nothing could be further from his mind, neither did he think the promoters of that meeting had any such intention. They were mostly gentlemen who were not members of this Institution, but who wished to see some Association filling the place which this Institution ought to fill, and no doubt would fill, now that the first resolution had been adopted. In moving the second resolution, he was pleased to find the subject mentioned in the report of the Committee, and he did not think it required any further remarks, as he believed all the members were agreed that the time for discussion of papers was too short.

Mr. CHEW seconded the resolution.

The CHAIRMAN said the Committee already had the power to call the meetings at such hour as they thought most convenient.

The SECRETARY thought the time of meeting might be safely left to the Committee to fix, according to the amount of business to be transacted. At times, there were no papers to read, or such as were not likely to draw forth much discussion.

Mr. S. HUNTER (Salford) was prepared to leave this matter to be settled by those who came from a distance.

Mr. CARR said the resolution did practically leave the matter in the hands of the Committee, who would, of course, regulate the time according to the business there was to transact.

The resolution was then put to the meeting, and passed.

The following gentlemen were elected as office-bearers for the current year:—

President . . .	Mr. T. Newbigging, M.Inst.C.E.	Manchester.
Treasurer . . .	Mr. James Paterson	Warrington.
Secretary . . .	Mr. Robert Hunter	Stalybridge.
Committee . . .	Mr. William Littlewood . . .	Manchester.
	Mr. George E. Saville	Sowerby Bridge.
Auditors . . .	Mr. Edmund Lord	Whitworth.
	Mr. George Smedley	Buxton.

The PRESIDENT, Mr. Newbigging, then delivered the following

INAUGURAL ADDRESS.

Gentlemen,—In occupying, for the first time, the honourable position to which you have elected me, I desire to congratulate you on the prosperous condition of the Association. Our meetings are, necessarily, of an interesting and instructive character, due to the large number of members who take an active interest in the proceedings. It will be my earnest endeavour, during my term of office, to maintain, and, if possible, increase their usefulness; and, with your willing assistance, there need, I think, be no fear as to the result.

Our object in periodically meeting together is twofold. We meet for social intercourse; but, primarily, that by the interchange of experiences and opinions, we may enlarge our knowledge of the profession to which we all belong.

To meet occasionally for social enjoyment, is not an unworthy purpose. In performing the responsible duties that devolve upon us, we have difficulties to encounter, in overcoming which, the watchful vigilance that is required of us throughout the twenty-four hours of each recurring day, puts a strain on the mental and bodily faculties, that calls for occasional intervals of relaxation. Hence, to associate with those who have passed through experiences similar to our own, to exchange the friendly greeting and the cordial shake of the hand, affords a healthy stimulus to both body and mind, and braces us to perform more efficiently the many duties that lie before us.

But the chief purpose of our meetings is, as I have said, to extend the domain of our professional knowledge. The experience of isolated individuals, however extensive, is too limited in its range to embrace within it more than a very few of the elements which go to make up perfection. We come together, we read our papers, we express our ideas, we contribute our quota of experience to the discussions, and gradually something tangible is built up before our mental vision. It is like the child's puzzle, composed of numberless disjointed pieces, each representing but little in itself, but, by dint of patient labour, and comparing one fragment with another, rejecting this for the time being and selecting that, difficult at first but sensibly becoming easier, the process of dovetailing the several pieces together goes on, till gradually the complete picture is evolved from chaos.

I do not mean to imply that any one subject with which we deal either is, or can be, thrashed out and digested at a sitting, or a dozen sittings. Nothing of the kind. Some of us probably go away confused and harassed with the variety of opinions we have heard expressed, and feeling that we know less of the subject than we previously thought we did. If that be so, it may generally be set down as a desirable frame of mind. Our little imperfect crotchets, that we had nursed and coddled, have been blown to the winds; our range of vision has been extended. We have got food for reflection; and, as we ponder the matter over in our minds, by the light thrown upon it by the varied experience of others, we begin at length to feel that we have gained a clearer insight into the subject, and have advanced a step nearer to the solution of the mystery.

In this way we grow in knowledge, and are better men, and better servants of our employers. We begin to realize that we are more fitted to give an opinion on the matters under discussion; not dogmatically expressing our views—for there is no more certain cure for dogmatism than rubbing against our fellows—but with the wise diffidence which arises from widened experience and more matured judgment.

The present winter has severely tried the capabilities of gas-works, their workmen, and responsible managers, throughout the district; and it may be recorded, with feelings of pride, that in no single instance have they been found wanting.

During the fog that has prevailed for days, I might say for weeks, together, the sun has been literally nowhere; and our streets, shops, and other places of business and resort would have been in a sad plight without the grateful presence and warmth of the gas-flame.

Whilst the value of gaslight grew in appreciation as the winter advanced, the opposite effect appears to have attended its threatened rival—the electric light. The hopes that by many were entertained of its speedy and successful application have grown small by degrees. The limited experience we have had of electricity as a lighting agent has convinced all who have given attention to the subject that vast improvements must yet take place, both in the means of generating and distributing the current, before it has the barest chance of supplanting the present system of illumination.

I have never wavered for one moment in the opinion which I hold, that the continued future use of coal gas is assured; and that it will be co-equal in permanency with the duration of the supply of the material from which it is derived. There are other sources of artificial light, besides electricity, that are equal, if not superior, to coal gas, in some respects; but the trouble, inconvenience, and expense attending their employment, prevent their coming in competition with it, so far as to effect its general use.

But if we consider for a moment, we shall arrive at the conclusion that no vast industry was ever, in any past time, or in any country, swamped in a day or in a year. I will go farther, and say that no great industry of which the world was proud ever has become extinguished at all. Even in things that are, from necessity, destined to change, the change, whilst inevitable, comes by slow degrees. Gas proprietors may take heart of grace, whilst they wish all success to scientific discovery and improvement.

My own opinion, in respect to electricity, is, further, that, unless the fluid, after its generation, can be stored in a manner similar to coal gas, or by some other method of accumulation, so that there shall always be a surplus stock, in case of temporary failure of the generating machine, or its motive power, from any cause, and such stock be capable of distribution—I say, unless this is accomplished, I believe that even its comparatively extensive use as an illuminating agent is not practicable. I leave out of consideration altogether, as being entirely secondary, the possibility of the unlimited subdivision of the current, and the question of cost or suitability in other respects. It is this very circumstance of storeage that has contributed, more than anything else, to the successful and world-wide employment of coal gas; for, without the reservoir to equalize its distribution, and ensure an unbroken continuity of supply, gas would have proved a certain failure for lighting, and the other purposes to which it is applied.

It is an instructive fact that Winsor, in his earlier experiments, tried to dispense with the holder, supplying the gas from the retort as it was generated, and found it impracticable to do so. Again, in the application to Parliament, in the year 1809, of the "National Light and Heat Company" for a Charter of Incorporation, whilst all the other principal apparatus of a gas-work were enumerated in the estimate of cost that accompanied the Bill, the gasholders were omitted—not from oversight, for Accum in his evidence, when replying to an allusion that had been made to the danger which might arise from an accumulation of gas, distinctly said: "If there is no reservoir, the gas cannot accumulate. There is no reservoir in Mr. Winsor's plan; the pipes contain the gas without reservoir." The defeat of the projected Company, on the occasion referred to, was principally due to the evidence given on behalf of the opposition by James Watt, jun., son of the great inventor or improver of the steam-engine. He dwelt strongly on the absolute necessity of storing the gas in holders, so that the accumulated stock might be ready to be employed whenever desired, and that there might be no failure in the lighting.

I see no reason whatever for believing that electricity has an advantage in this respect over gas; or that the dynamo-electric machine and its engine are more suitable than a series of gas-retorts in this particular. The deficiency, however, was easily and speedily remedied in the instance of coal gas; but he would be a sanguine man who would venture to predict the same, or a like easy remedy in the case of the electric fluid. Let inventors turn their attention in this direction, and a rich reward will await the success of their labours. When the power of storing, and gradually distributing the electric fluid from such surplus store, is proved to be possible, gas shareholders may begin to have some fear for the value of their investments; but, until then, they may rest in tranquil possession of their property, in so far, at least, as electricity is concerned.

I am content to rest the case of electricity *versus* gas there. The other matters, such as unlimited subdivision and regulation, important though they be, are, in my opinion, subsidiary to the great question of storeage; and the failure to achieve these would not be a fatal obstacle to the very general use of electricity for illumination, provided the other were overcome.

In taking this common-sense view of matters, it will not be made a charge against gas managers and engineers that they are opposed to scientific progress in the shape of electrical or any other rival system of lighting. They are content to give a fair field to invention, and they ask no favour for themselves. What they desire to be known is, that timid stock and share holders are not to be taken as the exponents of their opinion on the subject. They are well able to appraise the value of their industry, which has become of sufficient importance to mankind at large, in more respects than one, to be ensured against extinction under any circumstances, save the exhaustion of our coal-fields.

The agitation consequent on the recent numerous displays of the electric light has had the effect, to a large extent, of putting a stop to necessary extensions in many gas-works. This was, perhaps, a natural result, under the circumstances. It is, nevertheless, to be regretted that advantage should not be taken, at a time like the present, when ironwork of every description is at a fabulously low price, and other materials and labour are comparatively cheap, to provide for the future heavy demand for gas that will inevitably ensue on a revival in trade.

To make extensions in a time of depression, such as is now being experienced, is desirable for several reasons. The extensions are executed with greater efficiency, because competition is stronger, and there is more time for deliberation; they provide employment for a number of workmen; and they are carried out at a smaller expenditure of capital than is possible under other circumstances.

I am not inclined to take the pessimist view of things that is entertained by some. Times of depression in trade are inevitable; they occur as naturally as the seasons. The majority of men, however, are not overprescient in their judgment. When trade is bad, they despair of its recovery; and when it is brisk, and money is being made, they live in a fool's paradise, and speak and act as though the time of prosperity would never come to an end. Our own experience, and the records of the experience of others, should teach us a different lesson. If this country were alone in its depression, there might be grounds for despair; but we know that such is not the case. Every country has suffered greatly, and, in several that I could name, the depression began long before its effects reached our shores. There are indications of returning confidence, both at home and abroad, and we may hopefully anticipate a gradual progress towards better days.

The question of street lighting has recently received more attention than had previously been bestowed upon it. Mr. Woodall, of the Phœnix, assisted by Mr. Sugg, has very opportunely demonstrated, in a practical manner, that, with a more liberal consumption of gas, in suitable burners, an almost equal, and certainly a better diffused light than that furnished by electricity, and at a much less expenditure of money, can be obtained, if desired.

The lighting of the streets is generally in the hands, and under the control, of the town authorities throughout the country, and it is a matter for surprise that they should not have attempted to remedy the inefficient lighting, of which the public have at times so loudly and justly complained. In many foreign towns, as I know from experience, more attention is bestowed to this matter than at home, the lamps being placed nearer together, and the consumption per burner being greater—and this, too, notwithstanding that the cost of the gas is considerably higher.

I am enabled, by the kindness of Mr. Sugg, to exhibit to you to-day his latest improvements in gas-burners and street-lamps, as employed by Mr. Woodall in his demonstrations in the Waterloo Road. The burners before you are adapted for a consumption of 15, 25, and 45 cubic feet of gas per hour each, and the light given, using London gas, is equivalent to 50, 100, and 200 standard sperm candles respectively. The same consump-

tion of Manchester gas would yield a light equal to 56, 112, and 225 sperm candles, at a cost for gas per hour of about ¼d., ⅝d., and 1¼d. respectively. The light, protected by a suitable lamp, is of the most beautiful and agreeable kind, and pleasing to the eye. The flame of the larger burner, viewed from a distance, resembles a massive globe of light. It produces none of that ghastly effect so characteristic of the electric light, and its diffusive power is greatly superior. Messrs. George Bray and Co., of Leeds, have also forwarded for inspection a number of their 80-candle power burners, and a variety of globes and burners for domestic and other lighting.

But now, gentlemen, let me put the very pertinent question, *cui bono?* What is the good of it all? Is it a fact that we really need or desire all this brilliant street illumination? Four months ago, at a meeting in this very room, I ventured to assert that it was unnecessary, and I am still of that opinion. That there is need for improvement in street lighting, I have freely admitted. Let the local authorities see to it that such improved lighting as may be considered satisfactory is introduced; but, as we say here in our bluff north-country fashion, "There is a difference between scratching one's head, and pulling the hair off." It would not be an agreeable thing to see the night turned into day, either by means of the electric light or by gaslight; and I, for one, shall not advocate any such extravagance. It has been demonstrated that the thing can be done by gas lighting, if desired, and at one-fifth the cost of electricity (as is proved by Mr. W. H. Bennett and Mr. Valon, in their report on the recent 24 nights electric lighting at Westgate-on-Sea); but as, in our private affairs, it is desirable to avoid parsimony on the one hand, and wasteful luxury on the other, so in this matter of street lighting, let us practise the virtue that is found in the exercise of the same wise economy.

It is satisfactory to observe that the question of the economical consumption of gas is receiving attention on every hand. This awakened interest may be expected to lead to very important results. It is well known that by the use of imperfect and unsuitable burners, and a disregard of the regulation of pressure, a proportion ranging as high as 50 per cent. of the light that gas is capable of affording, may be, and often is utterly lost in the consumption.

It grieves one to think that, whilst the various bye-products of our gas manufactories are being utilized to the utmost, the gas, for the supply of which the gas manufactories were primarily called into existence, should be so prodigally wasted at the burner.

The gas manager has not hitherto been to blame for this undesirable state of things. His supervision has, as a rule, been supposed to end at the meter outlet. The internal arrangement and size of the fittings, and the description of burner employed, have been left to the combined wisdom—or ignorance—of the consumer and his gas-fitter; and whilst freely admitting that there are intelligent gas-fitters, who are capable of advising their customers, and who possess a knowledge of the principles of illumination, it will not be disputed that the majority are utterly wanting in this knowledge. I have said that gas managers have not hitherto been greatly to blame; but if, under the altered circumstances of the times, they do not exert themselves to disseminate information on these points within their respective districts, they will not deserve to be free from censure.

On the legislation of the past year, as affecting gas interests, there is but little to be said. The "Weights and Measures Act" of last session scarcely affects gas companies in the northern parts of the country. Coke is almost invariably sold by the hundredweight and the ton; and the liquid products either by the gallon measure or the ton weight, and all that is required is to see that the weight or measure of the respective materials is what it professes to be.

I cannot let this opportunity pass without referring to the loss sustained by the gas world during the past year in the death of Mr. King, the Editor of the JOURNAL OF GAS LIGHTING. At the annual meetings of the parent Association, his kindly presence was familiar to all of us. A man of retiring habits, he was enthusiastic on all matters pertaining to our profession, and few men have worked harder and done more to promote the interests of its members. His loss to myself was that of a personal friend, and it was only in that capacity that his many and varied excellencies could be fully known and appreciated.

It is satisfactory to note that, whilst the numerous district Gas Associations throughout the country are in a flourishing condition, and doing useful work, the parent Association maintains its high position, its annual meetings being looked forward to and prized for the superior opportunities they present of comparing notes and exchanging opinions with our brethren in every part of the United Kingdom. All this is indicative of a desire on the part of gas managers to acquire and to disseminate a scientific knowledge of their business; and it is a pleasing characteristic of these meetings that their own selfish interests have but rarely been the subject of discussion by the members; their duties and responsibilities, and how best to discharge these worthily, both to the authorities and the general public, occupying a foremost place in their proceedings.

The conviction is growing more strongly on me day by day, that, as the result of all this interchange of opinion in the various Gas Associations, and the thoughtful attention that is being devoted by gas managers to the details of their business, that rapid strides will be made, and great improvements will be introduced in gas manufacture in the near future. In the presence of this growing intelligence, scientific methods of working must take the place of the clumsy operations that have so long held their ground amongst us. Difficult as the problem is to solve, I do not despair of seeing a radical change effected in the mode of carbonizing. The system of heating retorts with gaseous fuel, with its attendant cleanliness and economy, cannot fail to make progress, now that there is awakened interest in the subject; and purification in closed vessels, by the use of certain of the very products that are eliminated as impurities, is all but accomplished, and requires only the master-mind to conceive the best method of perfecting the process.

An interesting correspondence recently took place in the columns of the JOURNAL OF GAS LIGHTING on the important question, "The Education of the Gas Manager of the Future." The letters that appeared on the subject were very ably written. There can be no doubt that an actual working experience in youth—say, from the age of fifteen to twenty—gives a man a positive advantage in after life as a manager; and if to his practical knowledge he adds that which may be gained by reading and observation, and study, such a man will generally be found taking a foremost place in his profession. It is a fact that practice and theory act and re-act upon each other, and increase our knowledge far beyond the mere sum of the two. In other words, a man who combines both theory and practice, and is able to make the most of them, is worth half a dozen men of merely practical or exclusively theoretical knowledge.

Without having absolutely taken part in the rough manual labour of gas-works, the manager should possess a mastery of the details of his business, in all its various departments; and, to enable him to acquire this mastery, he should have a quick eye for observation and discrimination. The habit of accurately observing is one that can be acquired; but, to cultivate it thoroughly, the heart must be in the work. Whilst possessing the ability to direct his workmen, he must also, as the administrator of a valuable property, be able to take a broad and thoughtful view of affairs. This is not compatible with burying one's head in a trench, so to speak, as I knew a manager of a large works to be in the habit of doing. He had a turn for main-laying, and fancied that, unless the work was principally done by himself, it would be imperfectly performed. These and other cognate matters are best left, under proper supervision, to the practical hand of the skilled workman.

Well, gentlemen, as this is the oldest, so let us each endeavour to make it the most useful of the branch Associations. We are situated in the centre of a wide and densely populated district, and the practical knowledge possessed by our members is, to say the least, not inferior to that exhibited by the gas managers of any other division of the country. We have abundant opportunities for observation and comparison, and it should be our aim to excel in the management of our respective works.

For the gas manager who is ambitious to excel in his business, there is no better mental exercise than preparing a paper to be read at one of these meetings. The habit of thought and reflection that is engendered by committing our ideas to paper is of special value, and the benefit to the author is probably greater than to the listeners.

I would say, therefore, to each member, but especially to the younger members of this Institution—Put down in writing the result of your personal experience, and do not be deterred from introducing a subject, howsoever hackneyed that subject may appear.

Let me just suggest a few topics on which papers might be prepared. The subject of *Carbonization* may be said to stand in the forefront of our business. If the carbonization be satisfactory, the first step in successful working is accomplished. And in this connection it would be highly useful to hear what is to be said *On the Comparative Merits of Clay Retorts and Brick Ovens;* the results obtained by the use of each could readily be set forth by those having practical experience of their use. Then there is the *Different Arrangements of Retort-Settings, having in view the Equalization of the Heats, and Economy in the Use of Fuel.* This is an important question, and worthy of repeated discussion. *The Mountings of the Retort-Bench* would form an excellent subject for a paper, and it has the merit of novelty to recommend it. *Experience with Different Forms of Condensers.* In the JOURNAL OF GAS LIGHTING for July 2, 1878, there appeared a thoughtful article by Mr. Webber, "On the Proportions of Gas Condensers," in which the author discusses the scientific principles involved in this branch of purification, and endeavours, from an understanding of these, to determine an exact method of proportioning the apparatus. Again, in the JOURNAL for July 23rd, there is a paper by Mr. W. P. Wilson "On Improvements Effected in the Various Forms of Condensers." Both these articles are well worthy of careful perusal and study, and, doubtless, they have attracted the attention of thoughtful gas managers. Condensation, important as it is, is still conducted in rather a hap-hazard fashion, and the apparatus employed in different works is of the most varied kind. We have the vertical and the horizontal forms of the apparatus, composed of large columns, and, in many instances, of pipes small in diameter; whilst some engineers are in favour of a single precipitating chamber of large area. *The Various Kinds of Exhausters* might be treated of to advantage. Then there is the important subject of *Washing and Scrubbing Gas*, and whether it is desirable that both processes should be adopted on the same works, and the advantages, if any, to be derived from combining the two. *The Materials Used in Purifying, and their Manipulation. The Storeage Capacity for Gas that is desirable in Manufacturing Towns.* Here, in the centre of a wide manufacturing district, our experience necessarily differs from that of managers in the non-manufacturing towns, and I apprehend that it would not be difficult to decide on the proper standard to adopt. *A Gas Manager's Winter Experiences* might combine both instruction and entertainment. *Expedients to be Adopted in Cases of Emergency* would give a few wrinkles worth remembering. *How to Reduce the Unaccounted-for Gas* would embrace the subjects of mains, service-pipes, and meters, and is of second importance only to the work of the retort-house. As bearing closely thereon, it would be interesting to have brought before us a statement of the progress that has been made both by Professor Barff and Mr. George Bower in their processes for the preservation of iron from corrosion. *The Management of Workmen* would elicit some valuable hints that many of us might profit by. *How to Disseminate Information amongst Consumers on the Best Mode of Burning Gas so as Develop the Maximum of Light it is Capable of Affording. How to Increase the Day and Summer Consumption of Gas.* The two latter are fast becoming the questions of the day with gas managers, as they include not only the question of light, but the correlative questions of motive power, and heat for warming and cooking. Several of our members have had much experience in the *Utilization of the Ammoniacal Residuals of Gas-Works*, and a profitable afternoon could be spent in a consideration of the desirability of managers generally adding this source of revenue to their operations. As bearing upon this point, I may call attention to the article that appeared in the JOURNAL a few weeks ago, written by Mr. F. W. Brothers, one of our members, describing and illustrating a method which, in conjunction with Mr. R. O. Paterson, he had discovered of utilizing the ammoniacal liquor in foreign works. In many places abroad the liquor is run to waste, for want of the acid necessary to its conversion into sulphate of ammonia; but by the adoption of the simple process described, a solid carbonate of ammonia is obtained, which can be packed in barrels, shipped to this country, and disposed of at a profit.

These are a few practical subjects which I commend to the attention of the members, and which might be profitably discussed at our meetings. The papers need not necessarily be long, so that they are to the point. In our growing experience, and in our daily observation as gas managers, we shall always find that much remains to be said on every detail of our business. There are many unsolved problems connected with gas manufacture that require discussion, and it would be an instructive paper, or series of papers, which would deal not only with what we think we know, but in regard to matters on which we are in doubt and difficulty.

We are to be favoured with a paper to-day by Mr. Walter W. Hutchinson, "On the various Apparatus used in Determining the Amount of Sulphur Compounds in Coal Gas, and some of the Results Obtained." It is highly important to know the amount of impurity that still remains in the gas after it has passed through all the various stages of purification, because a clear knowledge on this head is essential to us in our attempts to reduce or eliminate it entirely; and we shall, therefore, listen with interest to Mr. Hutchinson's paper.

And now, to conclude, it is exactly ten years this month since the Manchester District Institution of Gas Engineers was formed. Such a period in the life of our Institution is sufficient to justify the hope that it has, at least, emerged from its swaddling-clothes; that it is established on a firm basis; and that it is an instrument of good to its members. Let us all determine that, so far as we are each personally concerned, the next decade of its existence shall be even more fruitful of advantage than the one that has passed away.

Mr. PATERSON (Warrington) moved a vote of thanks to the President for the very able and admirable address he had just given.

Mr. HUNTER (Salford) seconded the motion. He considered there was much in the address that they might apply to their profession, with advantage both to themselves and their employers.

The motion was then passed, and was briefly acknowledged by the PRESIDENT.

Mr. CARR proposed, and Mr. MILES seconded, a vote of thanks to the EX-President, Mr. Clarke, for the very efficient manner in which he had discharged his duties during the past year.

The PRESIDENT, in putting the motion to the meeting, said the presence of so large a number was some evidence of the admirable way in which Mr. Clarke had discharged his duties.

The motion was carried with acclamation.

Mr. CLARKE briefly replied, thanking the members for this recognition of his services. If, said he, he had not fulfilled all their expectations, he was conscious of having done the best he could.

Mr. J. R. SMITH (Padiham) proposed a vote of thanks to the Committee and other Officers, which was seconded by Mr. CHEW, and carried unanimously.

This concluded the business of the meeting.

THE WATER SUPPLY OF GEELONG AND SANDHURST, AUSTRALIA.

At the Meeting of the Institution of Civil Engineers, on Tuesday, Feb. 4—Mr. W. H. BARLOW, F.R.S., Vice-President, in the chair—the first paper read was on "The Geelong Water Supply, Victoria, Australia," by Mr. EDWARD DOBSON, A. Inst. C.E.

The Author stated that in August, 1871, Lieut.-Col. Sankey, R.E. reported to the Victorian Government, recommending the construction of the following works, some of which had only been partially executed, viz.:—1. An open channel from Wallace's Swamp to the Stony Creek reservoir; 2. A storeage reservoir at the head of Stony Creek, 26 miles from Geelong, with a capacity of 754 million gallons; 3. A brick-lined aqueduct, communicating by a natural watercourse with a small pipe-head reservoir at Anakie Gap, holding 1,330,000 gallons; 4. A length of about 13¾ miles of 12-inch and 14-inch main, leading from the pipe-head reservoir to the service reservoir; 5. A service reservoir at Lovely Banks, with a capacity of nearly 6 million gallons, and filter-beds to pass 1,250,000 gallons of water every 24 hours; 6. About 4 miles of 16-inch and 2½ miles of 15-inch main, leading from the service reservoir to the town of Geelong; 7. About 42 miles of sub-mains, varying in diameter from 12 inches to 3 inches. The population of Geelong and its suburbs was under 25,000. The cost of these works, up to the 1st of July, 1871, had been £281,772. Among Colonel Sankey's suggestions for the completion and improvement of the water supply, the following were important, as bearing on the subsequent history of the works—viz., that the water should not be allowed to rise within 15 feet of the bye-wash, until all subsidence of the dam had ceased; that, instead of conveying the water to the pipe-head by an open aqueduct, a main should be laid for the whole distance; that relieving reservoirs should be constructed between Anakie and Lovely Banks, to lessen the pressure on the main; and that there should be a bye-pass at the service reservoir, to allow the latter to be shut off for repairs without interfering with the town supply. Several of these works had been successfully completed under the immediate direction of the Author, as Resident Engineer of the Geelong district, Mr. George Gordon, M. Inst. C.E., being the Chief Engineer of the Victorian Water Supply.

The works which formed the subject of the paper were:—The failure and repair of the Upper Stony Creek reservoir; the construction of a concrete dam at the lower reservoir; the driving of a tunnel, 88 chains long, through a volcanic formation at Anakie Gap; and the laying of a new 9-inch main, for a distance of 4 miles, through the gorge of the Stony Creek valley. The failure of the Stony Creek dam was attributed to an injudicious selection of the site, the foundation being unsuitable for its construction. This had led to the subsidence of the puddle wall, and, after the water had been let out of the reservoir, to a slip of the water face of the dam. The dam was repaired by pumping out the water and slush lying below the level of the outlet-valve; by cutting a new bye-wash at the north end of the dam, 27 feet lower than the original bye-wash; by placing the stone from this cutting in front of the slip; and by bringing the bank up from the new toe at a slope of 4 to 1 instead of 3 to 1. The cost of these repairs was under £4000. The concrete dam at the lower reservoir had been erected in a gap at the lowest of the reefs which divided the Stony Creek valley into basins, giving a storeage reservoir of about 142 million gallons, with a depth of 42 feet of water over the outlet-pipe. The concrete was broken sandstone, quarried on the spot, mixed with cement mortar, made of pit sand and Portland cement, in the proportions of—2-inch metal 4½, screenings 1½, sand 1½, and cement 1. The foundation of the dam was chiefly on vertical strata of slate and sandstone. The form of, and the mode of construction of the dam were described. The cost of the work was £17,000, exclusive of engineering superintendence. On the line of the new main, five short tunnels were driven through spurs in the gorge of the Stony Creek, which spurs consisted of vertical strata of sandstone and hard slate, the strike being at right angles to the direction. The minimum size of the tunnels was 6 feet by 3 feet, and their total cost was a little more than £3 per lineal yard. The main difficulty experienced was in respect of the ventilation of the headings of the principal tunnel at Anakie Gap. Both lithofracteur and ordinary blasting powder had been used. The wages paid at this tunnel per day had been 5s. for boys, 6s. 6d. for labourers, and 7s. for miners. The works for the length of 4 miles, on the course of the 9-inch main, which connected the lower reservoir with the 14-inch main, comprised 21 creek crossings with 16 stone weirs, two heavy rock side cuttings, two retaining walls across gullies, and six tunnels of the aggregate length of 2094 yards; whilst the levels of the ground passed over varied from 150 feet below to 115 feet above the hydraulic gradient. As a regular gradient was impracticable, the plan pursued was to follow the bottom of the valley to the mouth of the gorge, then to tunnel through the spurs, where the windings of the creek would have made this course too circuitous, and to ascend by a steep incline, so as to obtain the shortest route to the tunnel mouth without rising above the calculated gradient To deliver the required quantity of 750,000 gallons every 24 hours, this gradient was fixed at 4 inches per chain for the 9-inch pipes, and at 2 inches per chain for the old 14-inch pipes. Instead of self-acting air-valves, blow-off cocks were attached to the mains at the principal summits, and the maximum delivery of the new mains was often 1,100,000 gallons in 24 hours, or 350,000 gallons in excess of the calculated delivery. The average cost of laying the new mains was less than 11s. per lineal yard. This included the cartage of the pipes for a distance of 24 miles, earthworks, retaining walls, and stone weirs, but was exclusive of the driving of the tunnels and of the cost of the pipes. The cost of laying the mains through the tunnel came to rather more than 11s. per lineal yard. The wages paid per day were 6s. 6d. for labourers, and 9s. for jointers.

In an appendix, the Author gave the details of the Stony Creek reservoir, aqueduct, and pipe-head reservoir; of the lower reservoir, new main, and Anakie Tunnel; of the distances and levels of the old main, from its junction with the new main to the valve-house at Lovely Banks reservoirs; and of the service reservoirs; with a statement of the expenditure under various heads upon the works of the Geelong water supply, from July 1, 1872, to Dec. 31, 1875.

The second paper read was on "The Sandhurst Water Supply, Victoria, Australia," by Mr. JOSEPH BRADY, M. Inst. C.E., who said that Sandhurst, the central town of the Bendigo gold-field, was about 105 miles north-west of Melbourne, by railway. The population dealt with in the water supply was 35,000, the number of houses 9150, the number of mines assessed 400, and there was a length of about 100 miles of proclaimed streets. The site occupied high ground between the River Campaspe and the River Loddon, and was drained by the Bendigo Creek. The elevation of the city varied from 700 to 900 feet above low water of spring tides at Melbourne. The average rainfall for 13 years was 23·13 inches, ranging from 10·95 inches to 38·57 inches. The heaviest fall of rain, in a single day, was 3·22 inches, in the month of February, 1871. The greatest amount of evaporation from one of the reservoirs, observed in any single day, was 0·50 inch.

Prior to 1858, Sandhurst was chiefly supplied by rain water, stored in small iron tanks above ground. During dry weather the water was obtained from small mining dams by carters, who sold their loads at about £3 5s. per 1000 gallons. In April of that year, the Bendigo Water-Works Company was formed, and subsequently carried on operations under an Act of the Victorian Parliament, of Feb. 24, 1859. The original scheme was a comprehensive one for domestic and mining supply, but financial difficulties led to the adoption of the former only, which embraced a storeage reservoir with a capacity of 60 million gallons, and the necessary mains and filter-beds, on the gravitation principle. The reservoir was quickly filled in ordinary seasons, but became empty in the drought of 1865, when the city was supplied with water by railway from the River Campaspe. The demand for water increasing, the Municipal Council purchased the Bendigo Water-Works for £43,000, and took possession on Jan. 1, 1872. The works consisted of one storeage reservoir, filter-beds equal to a delivery of 200,000 gallons per day, and about 12 miles of mains, from 3 inches to 7 inches in diameter. The Author, who had completed the works of the Company, was engaged by the City Council to design and carry out the necessary extensions. In the Sandhurst district there were now two storeage reservoirs and filter-beds, and about 63 miles of mains and reticulation pipes. The reservoirs were named the Big Hill, constructed by the Bendigo Water-Works Company, in 1858-59, and the Crusoe, constructed by the Sandhurst City Council, in 1872-73. The surface-level of the former reservoir was 991 feet above sea-level; its area was 18 acres, and gathering-ground nearly 4000 acres. The formation was schistose. The dam was of earthwork, with a central puddle wall. It was 350 yards long, 30 feet high in the middle, and abutted on abrupt hills at each end. It contained 77,000 cubic yards of material. The average cost of the earthwork was 1s. 7½d. per cubic yard, and of the puddle, 4s. 9½d. The top width was 12 feet, at 5 feet above the highest water-level. The inner slope was 3 to 1, covered with gravel, and the outer one was 2 to 1, soiled and grassed. Further details were given of the dam, and of the method adopted in consolidating it. A bye-wash through a depression in the hills, provided for the passage of surplus water into a neighbouring valley, clear of the locality. The outlet was by a 7-inch cast-iron pipe, well protected, and fitted with a brass delivery-valve, of Messrs. Guest and Chrimes's pattern.

A few years after completion, an accident happened to one of the pipes. During the repairs, water was drawn from the reservoir over the dam by a 5-inch cast-iron syphon, which has since been used as an auxiliary to the 7-inch delivery-pipe. The construction of a pair of filter-beds, each 45 feet square, was then described; but as sand filtration did not sufficiently purify the water, which contained 30 to 40 grains of clayey matter to the gallon, at first two settling-ponds, and afterwards a third pond, adapted for the purification of the water by the lime process, were added, with a capacity respectively of 30,000, 22,000, and 123,000 gallons. The maximum daily supply of water that could be delivered from these works was 200,000 gallons, and the supply had latterly been limited to the higher levels of the city.

The Crusoe reservoir had a capacity of 330 million gallons. Its area was 80 acres, and its greatest depth was 40 feet. The dam was of earthwork, 700 yards long, with a maximum height of 47 feet. The total quantity of earthwork, including puddle, was 306,000 cubic yards, and it cost £25,400, besides £4357 paid for compensation. The dam was 12 feet wide at the top. The inner slope, of 3 to 1, was covered with rough stone pitching and gravel, and the outer one, of 2 to 1, was grassed. The construction of the dam was carried out by contract, under a schedule of prices, and was fully described. The level of the top of the dam at each end was 4 feet above the highest water-line, rising to 7 feet for the middle length. Provision was made for shrinkage, which had occurred to a small extent; but the slopes of the dam had quite preserved their form. The bye-wash of the reservoir was arranged in a depression of the hills, and discharged the surplus water into a lateral valley clear of the works. The outlet of the Crusoe reservoir was by a cast-iron syphon, 18 inches in diameter and 515½ feet long, the inner leg being 206½ feet, the crown 88 feet, and the outer leg 221 feet. The syphon did not cross the dam at right angles in a vertical plane, but was laid on its side. Details relating to the syphon were given. It led to a valve-house, and finished with a bell-mouthed end in the lime pond of the settling-works, under a constant head of 4 feet of water. The syphon was filled with water in January, 1873. At a level of 908 feet, the discharge of water was 4500 gallons per minute. At 938·5 feet, the discharge was 9700 gallons per minute. In connection with this reservoir, there were filter-works or settling-ponds sufficient for the treatment of 1 million gallons of water per day. The remaining 2 million gallons of unfiltered water could be used for mining or irrigation purposes. The Crusoe settling-ponds were described in detail; their object was to clear large quantities of water without the agency of sand filtration. Excellent bricks were manufactured within 300 yards of the site, at a cost of £2 3s. per 1000. The principal items of work were:—

	Cubic Yards.	Schedule Rate.
Excavation in clay and schistose rock	16,401	£0 1 8
Brickwork in cement	3,149	£2 5s. to £2 15s.
Cement concrete in floors	2,117	£2 0 0
Puddle behind walls	1,284	0 4 6

The rates of wages for eight hours work were:—Bricklayers, 12s. per day; bricklayers labourers, 8s.; fitters, 12s.; blacksmiths, 10s. to 11s.; ordinary pick and shovel men, 6s. 6d. to 7s. 6d.; and horse and cart and driver, 14s. per day. Various precautions observed in carrying out the works were enumerated. In preparing the water, it was delivered from the syphon into the lime pond, where it was mixed in the proportion of 1 lb. of lime per 1000 gallons of water, and passed into one of the settling-ponds, in which the water became clear in about ten hours. After this the water was drawn off as required into the service reservoir. The settling-ponds required washing out every three months; the service reservoir was cleansed annually. In connection with the Big Hill and Crusoe reservoirs there were two distinct mains, each with one system of reticulation. The mains of the former system were 12½ miles in length; of the latter system, 50½ miles.

The paper concluded with some details of the service relating to the mains, the fittings, and the maintenance.

DIETERICH'S NEW METHOD OF HEATING RETORT BENCHES.

By Major G. Warren Dresser, C.E., Editor of the *American Gaslight Journal*.

[A Paper read before the Society of Gas Lighting, Dec. 12, 1878.]

About the middle of the month of December I visited Baltimore for the purpose of examining the system of heating benches devised and put into practical operation by Mr. Chas. F. Dieterich, the Engineer of the People's Gaslight Company of Baltimore, Maryland.

One entire range of 20 benches had been adapted to the use of the new furnaces, and of these as many as were required for the entire daily make of the works were in action, so that the working was a practical retort-house working for the whole make, and not an experimental bench.

The principle upon which the furnaces are constructed is to secure the combustion of the carbonic oxide gases from the coke, by means of heated air introduced at the point where the gases enter the oven. To effect this, the furnace is built outside, just in front of the bench, and below the level of the retort-house floor. It is very simple in form, being on the inside 14 in. wide, 5 in. deep, and 2 ft. 6 in. long. The inner lining is of fire-brick, 12 in. thick. Outside this is an air space all round, 6 in. wide, and outside this a 12-inch brick wall. In the air space, galvanized iron pipes of rectangular cross section, about 4 in. by 6 in., are introduced on each side of the furnace, leading from the bottom of the airspace, where they take in the outer air by means of stoppers, and pass back and forth in a zig-zag manner towards the top and back of the furnace, into a small chamber on each side, whence the air, having become heated, passes into the throat of the furnace-flue, in finely-divided streams, by means of nostrils or openings. This point is very nearly the same, in relative position, as that which the common furnace occupies in the ordinary setting. The top of the furnace is covered by tiles of fire-brick, set in an iron frame, and this in turn by an iron cover standing a few inches above it, with a rim projecting downwards into a sand seal. When these covers are on, the top of the furnace is practically air-tight.

At the bottom of the furnace, grate-bars, similar to the ordinary ones, extend the whole length of the furnace, and beneath them is an ordinary ash-pan. The grate-bars are supplied with two sets of bearing-bars, one at the level of the bottom of an ordinary furnace-door, and another about 6 or 8 inches above. This is for convenience in clinkering, which is done by withdrawing a portion of the bars from the lower or permanent rest, and driving these through the fire above the upper ones. This holds the body of coke in place in the furnace. Then the remainder of the lower bars are withdrawn, and the clinker which has accumulated at the bottom of the fire allowed to fall into the ash-pan. The bars are then replaced, and those above drawn out and put in their place below; the fire settles down on to the grate, and the operation is completed—the whole requiring about three minutes. This operation is necessary only once in eight hours.

When the charge in the retorts is burned off, the cover is removed from the furnace, the lids of the two lower retorts are struck, and the hot coke raked directly from the retorts into the furnace beneath, which, upon being properly filled, is immediately covered, and the two lower retorts are recharged; after which the upper retorts are drawn into barrows, and the coke removed to the yard as usual. The custom at the works referred to is to draw several of the lower sets of retorts in different benches in succession, and then return to draw the upper ones.

The advantages resulting from this arrangement of furnace are several:—

1. A more perfectly uniform heat throughout the bench than I have ever seen by any other method. The retorts appear to be uniformly heated up to the mouthpieces. The upper and lower retorts are heated alike. There is no flame to be seen in the bench by taking out any one of the stoppers. There is no flame at the chimney-top on the top of the bench, excepting at the moment of clinkering. No cold air can possibly get into the bench.

2. The charges are as thoroughly burned off in three hours as they would be in four hours by the old method. The retorts in question were 12 in. by 20 in. by 8 ft. 6 in., and I saw a charge of 1250 lbs. per bench of sixes as handsomely burned off in three hours as it is usual to see in running four-hour charges; and the heats were not excessively high, judging by the colour of the retorts and the appearance of the interior of the ovens.

3. The illuminating power of the gas is fully equal to that obtained by the old method, with the same coals, and a slightly smaller per centage of cannel.

4. The character of the labour required of the men is not nearly so trying as by the old system. The stokers have no fires to attend or clinker, which all know is by far the most exhausting labour in the retort-house; and, although they have to charge and draw oftener, the work is easier than where the fires have to be attended, and the charges are less frequent. The skill required for keeping the fires going, and keeping the heats up, is reduced to a minimum, as one man can attend the fires for 14 benches with great ease, and, from the arrangement for clinkering referred to above, very little practice will enable any one to manage the fires. In case of a strike, this is an important item.

5. One-third of the coke made is more than enough to keep the furnaces supplied with fuel, although this would depend upon the character of the coal used, and the coke obtained from it.

6. It can be adapted to any bench without disturbing the present arrangement of retorts.

As evidence upon some of these points, I give below figures taken from the daily report-book for the months of October and November, 1877 and 1878. During these months in 1877, the workings were by the old system; and during the same months in 1878, the workings were by the new.

October.	1877.	1878.
Number of retorts in use, daily average for month.	77	59
Coal carbonized, tons—total for month	1203·36	1060·85
Do. lbs. per retort, each charge.	186·72	185·94
Gas made, cubic feet, per retort in 24 hours	5471·00	6478·00
Do. cubic feet per lb. of coal . .	4·88	4·99
Illuminating power, candles . .	17·00	17·11
Duration of charge, hours . .	4·00	½ mth. 4; ½ mth. 3
Coke made per ton, bushels . .	38 to 40	38 to 40
Do. burned in furnace, bushels per bench	80	52
Coal used	2-3rds Fairmont. 1-3rd Coal Valley. 5 p. ct. Cannelton.	Fairmont. 2½ p. ct. Cannelton.
Total gas made in month, cubic feet	13,319,200	11,856,000

November.	1877.	1878.
Number of retorts in use, daily average for month	96	63
Coal carbonized, tons—total for month	1361·76	1255·94
Do. lbs. per retort, each charge .	176·52	184·59
Gas made, cubic feet, per retort in 24 hours	5101·00	7156·00
Do. cubic feet per lb. of coal . .	4·81	4·84
Illuminating power (City Inspector) candles, average . .	17·00	17·50
Duration of charge, hours . .	4·00	3·00
Coke made per ton, bushels . .	38 to 40	38 to 40
Do. burned in furnaces, bushels per bench	78·00	51·48
Coal used	2-3rds Blacksburg. 1-3rd Fairmont. 5 p. ct. Cannelton.	Fairmont. 2½ p. ct. Cannelton.
Total gas made in month, cubic feet	14,693,000	13,612,000

Owing to the peculiar method of regulating the lighting of the street-lamps in Baltimore, it is often necessary to keep more retorts fired up than can be used to advantage.

It is evident that by this system, from the figures given, the same, or even larger charges may be burned off in three hours than were formerly burned off in four; or, in other words, the same gas made in three hours which, by the old method, required four hours. This is equal to increasing the capacity of the retort-house 33 per cent.; for, in 24 hours, 8 × 1250 = 10,000 lbs. of coal are carbonized per bench, instead of 6 × 1250 = 7500 lbs.

The wear and tear upon the bench must also be reduced, inasmuch as the heats are kept much more constant and uniform; and even when retorts are "missed," their cracking is much less frequent.

This furnace can be adapted to any bench without disturbing the settings in any respect, except by the removal of the common furnace and ash-pan. Certainly, it appears, when viewed in operation as it is in Baltimore, working practically throughout all the benches in use, that this is no experiment; and it is worthy of careful study, inasmuch as it enables the gas maker to turn out a larger product from his apparatus, with less and lighter labour, and must result in lessening the cost of making.

The depth to which it is necessary to go below the ordinary retort-house floor level is about 7 ft. 6 in. The details of adapting it would, of course, have to be worked out for each case; but where there are retort-house cellars, the easiest case would occur, as no excavations whatever would be required.

The cost of the material and work necessary for putting the furnace in working order under a bench would vary from 300 to 500 dollars.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

There is considerably less demand for all descriptions of coal, and prices are easier. One large firm in the Manchester district has this month made a reduction of 1s. 8d. per ton upon house coal delivered to private consumers, and 5d. per ton upon burgy and slack delivered to works, and in other districts less money is being taken to secure orders, although nominally the quoted rates are without change. House-fire classes of fuel are now only in limited demand, and in the inferior descriptions of round coal the market is very dull. The extra pressure which has been put upon gas companies during the past winter, in consequence of the prevalence of foggy weather, has caused some of them to come into the market for small supplies to carry them through the remainder of the season; but the business doing is of no importance so far as the market generally is concerned, and the few inquiries which are at present being made for next season's contracts do not as yet bring forward many quotations from colliery proprietors. Steam and forge coals are very bad to sell, and burgy and slack are generally a drug, with a great deal of pushing for orders at very low figures. The average prices at the pit mouth are about 9s. to 9s. 6d. per ton for best Wigan Arley; 7s. to 8s. for second qualities and good Pemberton four-feet; 4s. 6d. to 5s. 6d. for common round coal; 3s. 9d. to 4s. 6d. for burgy; and 2s. to 3s. per ton for slack.

There has been a considerable falling off in the demand for shipment, and buyers are able to place their orders at very low prices.

The coke trade continues in a very depressed condition, and Lancashire makers have very little chance of securing orders, owing to the low price at which north country cokes are now coming into the market.

The slightly better feeling noticed last week in the iron trade has had no material effect upon the amount of business doing. Lancashire makers of pig iron are selling little or nothing, as they are still so completely undersold by outside brands; and in the finished iron trade there is very keen competition for all orders coming into the market, and recent contracts for pipes, both for water and for gas purposes, have been placed at extremely low prices.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

Stormy weather and adverse winds prevailed in the early part of last week again. Steamers employed in carrying gas coals got behind time a good deal in consequence. Shipments were hindered at the Tyne Dock. All the tonnage which was needed did not reach the Tyne until Thursday and Friday, when a better business was done. The compromise between the Durham coal owners and pitmen proposed last week is likely to be effected. There is no fear of a strike, or anything of that kind. As the days begin to lengthen, the demand for gas coal falls off slightly. Those collieries which have not good contracts are not working so well. Second-class gas coals stand somewhere about 1½d. below 6s. per ton. The other branches of the coal trade of the North of England do very moderately.

The coasting shipping business remains in a somewhat depressed condition; 4s. per ton was the highest rate paid steamers to load coals for London last week. The following may be considered the quotations for boats to load gas coals:—Dublin, 6s. 6d.; Havre, 5s. to 5s. 3d.; Rouen, 7s.; Copenhagen, 4s. 6d.; Swinemunde, 5s.; Kiel, 6s.; Fairwater, 4s. 6d. per ton. 9s. 9d. per ton has been paid a sailing ship to load gas coals for Limerick; 7s. to 7s. 3d. to sailing vessels to load similar coals for Poole. Newhaven (gas coals), 6s. 4½d., and gas-pipes, 6s. 7½d. Other outward freights are proportionately low.

There is an excess of steam tonnage in the market, and shippers are likely to have an easy rate of freight over the first half of the year. With regard to general manufacturing business, it is quiet. The chemical market has hardly maintained recent rates. A little "bulling" was done upon Newcastle Quayside last week in chemicals, but it failed to keep prices up. They fell about 2 per cent. The lead trade was a little better last week. The fire-brick and fire-clay goods trade generally was quiet.

There was a strike of about 8000 iron shipbuilders on the Tyne last week. Several attempts have been made to compromise matters. It is quite likely that by the time this goes to press things will have been

settled, and the men be at work again. There are not so many men out of employment in the North as there were about Christmas. This arises mainly from the fact that we are now having milder weather, and outdoor employment has been resumed. In other respects there has not been much improvement in the labour market.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

It seems that a serious hitch has arisen in regard to the prospects of the Inverness Gas and Water Commissioners application for a Provisional Order to raise a large sum of money for the purpose of meeting past outlay that was not calculated upon, and providing for extensions of the works in the immediate future. As at present advised, the Lord Advocate is unable to recommend that increased borrowing powers should be given to the extent asked; and at a meeting of the Police Commissioners last Wednesday, the Provost was authorized to go to London for the purpose of giving explanations to the Lord Advocate in reference to the matter, by way of enabling his lordship to form a final opinion as to the course to be taken.

On the question of meters fixed within the area supplied with gas by the Glasgow Corporation Gas Commissioners, I have a few interesting figures to give. At the close of the year ending June, 1877, there were no fewer than 123,769 meters of various sizes under the inspection of the Commissioners officers; and at the close of the following year the number had increased to 130,071, the increase for the year being 6302. At the end of January of the present year the total was brought up to 131,807. The times are very dull and depressed, and new houses and places of business are not letting well this year, and therefore the increase of new consumers is not expected to be up to the average at the forthcoming Whitsunday term; but there will then doubtless be a considerable advance upon that grand total, when the annual returns are again made up at the end of June, 1879. These facts may enable comparisons to be made in other large towns and cities where there is a great consumption of gas; but I scarcely expect that any single Gas Company or Gas Corporation can be mentioned whose number of meters in actual use is equal to 139,000—the number now probably passing Glasgow Corporation gas.

The following data may also be of interest to gas people in other towns. In the year 1873-74, the production of gas per ton in the various works of the Glasgow Gas Commissioners was, on the average, 8553 cubic feet, increasing to 9383 feet in the year 1874-75, to 9746 feet in 1875-76, declining to 9693 feet in 1876-77, and then increasing to 10,028 cubic feet in the year 1877-78. At the beginning of that period of five years, the price was 4s. 7d. per 1000 cubic feet, and before the year closed it had risen to 5s. 5d., at which it remained throughout the following year. Then it fell to 5s. and 4s. 7d. in the year 1875-76, to 4s. 2d. in the following year, and to 4s. in the year 1877-78.

I regret to have to announce the sudden death of a highly respected Scotch Gas Manager—namely, Mr. John Waddell, Wishaw, and formerly of Kirkfieldbank, near Lanark. On Friday week he was in Glasgow doing business, and he was suddenly affected with illness, which proved fatal on Tuesday. With the view of furthering his professional education, Mr. Waddell had became an enthusiastic student of chemistry, in which branch of science he attended lectures at one of the chemical laboratories in Glasgow.

Authority has just been obtained for the formation of a special water supply district for the famous earthquake district of Perthshire, of which the village of Comrie is the centre, and a scheme is already well under way.

The Falkirk Municipal Authorities are in a quandary in regard to the source from which to obtain their much-needed new supply of water. All the inquiries which have yet been made by the Engineers and Chemical Analysts whom they have had engaged, have hitherto proved fruitless. Within the last few days another new scheme has been proposed, and a Committee has been appointed to inquire and report upon its probable suitableness.

A new water supply scheme has very recently been adopted by the Local Authority of Aberdour, near Burntisland. It is expected to cost well-nigh £4000.

There were transactions during the past week in Glasgow Corporation 9 per cent. gas annuities at an advance—£209½ being paid in Edinburgh on Thursday. On the same day the 6¾ per cents. also improved, and were sold at £157.

The Glasgow pig iron market was very strong during most of last week, and a large business was done every day. Up to 44s. 1½d. cash was paid on Wednesday, but the close on Friday was 43s. 10½d. for buyers; sellers a little dearer.

No new feature of any importance has arisen in the coal market during the week.

CLEATOR MOOR GAS COMPANY, LIMITED.—The annual general meeting of this Company was held last Tuesday, when the Directors reported that for the year ending the 31st of December, 1878, the receipts on revenue account amounted to the sum of £1881 18s. 3d., and the expenditure to £1150 11s. 5d., leaving a balance of £731 6s. 10d. to the credit of profit and loss account. This, with the balance brought forward from last year, and after providing for bank and preference shareholders interest, bad debts, &c., left an available balance of £461 15s. 7d., out of which the Directors recommended a dividend at the rate of 5 per cent. per annum (which would absorb £384 5s. 0d.), the balance of £77 10s. 7d. being placed to a reserve-fund.

THE PROPOSED PURCHASE OF THE NEWINGTON (YORKS.) WATER-WORKS.—At the meeting of the Newington Local Board on Monday, the 17th ult.—Mr. Walton in the chair—Mr. Jennings moved, pursuant to notice—"That the resolution moved by Mr. Walton, and passed by the Board at the last meeting, concerning the non-purchase of the Newington Water-Works, be rescinded." In doing so, he said that his reason for proposing that the original resolution be rescinded was, that when it first came before them it was merely in favour of an inquiry, whereas in the motion carried, the word "inquiry" was not mentioned; and seeing that there were 300 houses occupied principally by poor people, which were not provided with a supply of water, he thought an inquiry was necessary. Mr. W. P. Garbutt seconded the motion, but thought that the feeling of the Board was such that it would be useless to press the matter. Mr. Jennings thereupon withdrew his motion, and, after some remarks by the Chairman, the matter dropped.

PORTSMOUTH GAS COMPANY.—On Saturday, the 22nd ult., the half-yearly meeting of this Company was held, when a dividend at the rate of 10 per cent. per annum on the A and B shares, 8 per cent. on the C shares, and 5 per cent. on the stock of the Company, was declared, less income-tax, payable on the 1st inst. £15 was voted to the Royal Portsmouth Hospital, the Committee of Management were re-elected, and Mr. W. S. Staunton was re-appointed as Auditor. The average illuminating power of the gas, within the half year ending the 31st of December last, was reported to have been 10 per cent. in excess of the parliamentary standard, a testing on 143 occasions showing the average to be 15·40 candles. The quantity of gas made during the half year had been 182,256,000 cubic feet, an increase of 9,039,000 feet upon the same period of 1877. The receipt during that period had amounted to £38,384 0s. 6d., allowing a balance of £9410 15s. 5d. to be carried to the profit and loss account.

THE OPPOSITION TO THE SOUTH SHIELDS GAS COMPANY'S BILL.—A public meeting of the ratepayers of South Shields, convened by the Mayor, in compliance with a requisition, was held last Tuesday, for the purpose of consenting, to and approving the payment of the expenses to be incurred in opposing the South Shields Gas Company's Bill now being promoted in Parliament. There was a small attendance, the total number of ratepayers present being about twenty. The Mayor moved a resolution consenting to the opposition, and agreeing to the expenses being paid out of the borough-fund and general district-rate, in equal proportions. Mr. W. W. Taylor moved the following amendment:—"That this meeting is of opinion that the proposed opposition to the Bill is unnecessary, and disapproves of any expenditure of the public money for such purpose." The motion was supported by Mr. Bushell and Mr. Duncan, and the amendment not being seconded, the original resolution was carried with one dissentient—Mr. Taylor.

LLYNVI VALLEY GAS COMPANY.—The half-yearly meeting of this Company was held on Monday, the 17th ult.—Lieut.-Col. Turbervill in the chair. The report of the Directors for the half year ended Dec. 31, 1878, stated that the balance at the credit of the revenue account was £290 0s. 3d., admitting of a dividend at the rate of 6 per cent. per annum, free of income-tax. The accounts would have shown more favourably, but for an unforeseen accident to the Company's mains, through the subsidence of some roadways by colliery workings. The Chairman said a claim had been made for the loss, and the Directors had just effected a compromise, and avoided a lawsuit. The report and statement of accounts were unanimously agreed to, and Messrs. J. H. Thomas and T. L. Roberts were appointed Auditors. A unanimous vote of thanks was given to the Chairman and Directors for their services during the past half year. At an extraordinary meeting held afterwards, the Shareholders unanimously authorized the Directors to borrow a sum not exceeding £860, at a rate of interest not exceeding 5 per cent., for extending the Company's mains to Cymmer and Glyn-corrwg.

BARNSTAPLE WATER COMPANY.—The half-yearly meeting of this Company was held on the 24th ult.—Mr. H. K. Thorne presiding—when the following report was presented:—"The half-yearly accounts submitted to the Shareholders show a balance of £523 7s. 10d. in the hands of the Treasurer, from which the Directors recommend that a dividend of 8s. per share be declared, payable on the 1st day of March next, amounting to £480, leaving £43 7s. 10d. to be carried over to the current half year. Three Directors—namely, Mr. T. Curtis, Mr. J. L. Gweek, and Mr. J. Harris—retire by rotation, and, being eligible, offer themselves for re-election. A vacancy also exists by the resignation of Mr. J. R. Chanter, and it will be necessary to elect a Shareholder to fill the vacancy. Mr. Turner, one of the Auditors, who retires by rotation, offers himself for re-election." On the motion of the Chairman, the foregoing report, as also that of the Auditors, certifying the correctness of the accounts, was received, and the dividend recommended by the Directors agreed to. The retiring Directors and Auditor were re-elected, and the vacancy caused by the retirement of Mr. J. R. Chanter was filled up by the appointment of Mr. E. Dennis.

THE GATESHEAD TOWN COUNCIL AND THE NEWCASTLE GAS BILL.—A special meeting of the Gateshead Town Council was held on Friday, the 21st ult., to sanction parliamentary opposition to the Bill promoted by the Newcastle and Gateshead Gas Company. The Mayor (Mr. J. W. Robinson) occupied the chair. Mr. S. Kent moved—"That the expense to be incurred by the Council in opposing the Gas Company's Bill shall be payable, and paid out of the borough-fund of the Corporation." Mr. B. Elsdon seconded the resolution, which was agreed to unanimously. Mr. Kent also moved, Mr. Lamb seconded, and after some discussion it was unanimously agreed—"That the Parliamentary Committee be authorized to take all such measures for the effectual opposition of the Bill of the Gas Company as they may deem necessary, the above powers including, among other matters, the employment of parliamentary agents and counsel, and the personal attendance of not more than three members of the Council, and of such witnesses as the Parliamentary Committee may deem necessary, in London during the progress of the Bill."—A public meeting of ratepayers was afterwards held in the Town Hall—the Mayor presiding—at which the opposition to the Bill was formally sanctioned.

THE ILKESTON LOCAL BOARD AND THE GAS COMPANY.—Some months ago the Ilkeston Local Board agreed with the Ilkeston Gas Company to purchase their works, &c., at Ilkeston, for the sum of £25,000, and subsequently the Board obtained sanction of the Local Government Board for a loan of £30,000 for the purpose. It was expected that the purchase would have been completed before the commencement of the present year, but it has not yet been made. The Directors of the Company recently sent a letter to the Board, asking them to name the time when they would be able to complete their contract, and the answer of the Board is to the effect that they have been for some time endeavouring to obtain a loan for the purpose of purchasing and extending the works, and that as soon as they are able to obtain such loan they will complete their contract with the Company, by purchasing the works at the price agreed upon. The Public Works Loan Commissioners offered the Board a loan of £30,000, but the rate of interest at which it was offered was considerably higher than that at which a previous loan for water supply purposes was obtained by the Board, and they declined to accept it. The Clerk of the Board has been again directed to apply to the Commissioners, with a view of obtaining a considerable portion of the sum required at a lower rate of interest than that previously offered.

DORKING WATER COMPANY.—The fifteenth half-yearly meeting of this Company took place on Saturday, the 22nd ult.—Mr. A. Powell in the chair. The Directors in their report alluded to the steps that were being taken for obtaining an increased supply of water from the high ground at the south-west of the town, and stated that, finding the first scheme proposed would be strongly opposed by the owners and occupiers of mills on the stream below, they had authorized an alternative scheme for a supply from the Rookery Estate, which it was computed would at least double the quantity of water now obtainable, and afford the population in the lower parts of the town the advantage of this increase by gravitation, leaving the other parts to be provided for by the existing works. The statement of accounts for the half year ending Dec. 31, 1878, showed the total expenditure on the revenue account to be £207 16s. 9d., against the receipts, amounting to £468 19s. 4d.; leaving a profit of £261 2s. 7d. The debit on the profit and loss account at the commencement of the half year amounted to £318 0s. 2d., which was now reduced to £37 5s., while the amount owing by the Company to sundry creditors had also been reduced from £125 5s. 6d. to £19 6s. 1d. The Chairman, in moving the adoption of the report and balance-sheet, referred at some length to what had been done in the matter of obtaining an increased water supply, and said one of the strongest opponents to the former scheme, on the ground of the injury it would do to his property and that of others who owned mills in the neighbourhood, was willing to co-operate with them in the scheme now proposed. They had experienced some diffi-

culty in getting the Board of Trade to accept this second scheme, as an alternative to the former one, because while the plans of the first scheme had been deposited with them during the time allowed, there had been a little infringement of the time in depositing those of the second. On the previous day, however, a letter had been received from their Parliamentary Agents, stating their belief that the principal objection to the adoption of the second scheme had been overcome. The report and accounts were then passed. Messrs. A. Powell and G. Curtis were re-elected Directors, and Mr. C. A. White, Auditor, a vote of thanks to the Chairman and Directors closing the proceedings.

SUNDERLAND AND SOUTH SHIELDS WATER COMPANY.—The annual general meeting of this Company was held on Monday, the 24th ult. Mr. Robert Vint presided, and, in moving the adoption of the report and accounts, he said that, the Company had paid in wages during the past year £4125, which showed a small increase of £254, owing partly to their having augmented their force for inspection, and the expense caused by the severe frost. In rates and taxes they had paid last year £4168, being an increase of £673 on the previous year. It was a matter of much regret that this item was continually increasing, inasmuch as the Company's district, being a very large one, included a number of parishes and townships in which new rates were being levied. Under the head of repairs, they had paid during the past year a sum of £3580, principally due to the overhauling of the Ryhope engines, to make them more efficient; and having spent the large sum of £1800 upon these engines, they were probably now in a better condition than when first set to work. The Company had paid on coals and cartage £2478, which showed a saving of £530. In fact, during the past two years, they had saved £1000 per annum in coals and cartage, besides pumping more water last year than was ever the case before, and at a smaller outlay. In salaries, again, they had effected a saving of £140. They would find that the total working expenses for the year amounted to £17,862, against £16,524 last year, this being explained by the money expended on the improvement of the Ryhope engines. Of this alteration, however, they were beginning to reap the benefit already and would continue to do so for years to come. He was glad to find that they were still keeping the working expenses within 40 per cent. of the gross income. During the year they had laid 7612 yards of new mains, and added 1074 new services, which meant generally so many new customers. This, he thought, considering the depressed state of trade during the past year, was very satisfactory, as they had in hand a balance of £27,770, which, after declaring a dividend at the rate of 5 per cent., would leave a considerable balance still to carry forward. Mr. Hills seconded the motion, which was carried unanimously. Dr. G. Berwick moved—"That a dividend at the rate of 5 per cent. on the ordinary and preference stocks of the Company for the half year ending Dec., 1878 (clear of income-tax), be declared, payable on the 1st day of March next, making, with the interim dividend paid on the 1st of September last, 10 per cent. for the year; also that interest at the rate of 5 per cent. per annum be paid on the amount called up on shares allotted Sept. 3, 1875." Mr. Macdonald seconded the resolution, which was agreed to. Messrs. Anderson, Hills, Glover, and Cox, the retiring Directors, were then re-elected, as was Mr. T. Squance, the retiring Auditor. Alderman Glover moved—"That the sum allowed in the future to the Directors be £500 instead of £400 per annum, it being desired by his fellow-Directors to hand the additional £100 to their worthy Chairman, in acknowledgment of his long, arduous, and faithful services in the interests of the Company." Mr. Davison seconded, and Mr. J. W. Hudson supported the resolution, which was unanimously agreed to. The Chairman having replied, votes of thanks to the Chairman and Directors for their services during the past year brought the proceedings to a close.

CITY OF POTSDAM WATER-WORKS COMPANY, LIMITED.—The fourth annual general meeting of this Company was held at the Company's offices, 7, Queen Victoria Street, London, E.C., on Tuesday, the 11th ult.—Mr. Francis Bennoch in the chair—when, after the notice convening the meeting had been read by the Secretary (Mr. Herbert R. Duke), the following report was submitted:—"In presenting their report for the past year, the Directors are gratified to be able to announce a substantial proportionate increase in the revenue of the Company from water-rates, as compared with 1877, although the number of additional consumers obtained during the year is not so great as had been anticipated. On reference to the revenue account, it will be observed that the receipts for the twelve months have been £1305 19s. 5d., which leaves a sum of £1979 0s. 6d. to be added to the amount already standing to the debit of profit and loss account. Extensions of the pipe system in the city of Potsdam have been made during the year to Moltke Strasse, Saarmunder Strasse, Neue König Strasse, Bertini Strasse, and Victoria Strasse, in all of which districts fresh consumers have joined. The total length of the pipe system is now nearly 25 English miles, and it is not anticipated that any further extensions will be required. The whole of the pipe system of the Potsdam Royal Water-Works has, by arrangement, been transferred to this Company free of cost, so that, in addition to its 40 consumers, who have now connected with the Company's mains, the pipe system, valued at upwards of £700, becomes the property of this undertaking without expenditure. Amongst the public buildings already supplied with water may be mentioned the following:—The Police Barracks, the Catholic Infirmary, the Palace of Prince Meiningen, the Royal Stables, the Cadet House, the Railway Station, the Military Orphan House, the building of the Government of the Province, the Accountant-General's Office, the Military Prison, the Infirmary, the Military School, the Cemetery, the New High College, and the Gauger's Office, whilst amongst prospective consumers who are negotiating for a supply of water are H.I.H. the Crown Prince of Prussia for the Royal Palace, and the Government for the several barracks in the city. The Authorities have decided to establish a thorough system of drainage throughout the city, and it is believed that this will be the means of securing a large additional number of consumers of water. The condition of the works is in every respect satisfactory, whilst the quality of the water supplied is exceptionally good, and the Directors have every reason to expect that the bulk of the inhabitants of Potsdam will by degrees avail themselves of the facilities offered by the Company. Although no decision has been arrived at in the matter of the dispute between the Magistrates and the Company, which has been referred to arbitration, the Board are advised that the result is likely to be in favour of the Company, and that a decision to this effect may shortly be expected. Since last meeting, Colonel Burdett has resigned his seat at the Board. At this meeting, Mr. Francis Bennoch and Mr. Robert James Hellard Tucker retire by rotation, and, being eligible, offer themselves for re-election. Mr. Frederick Latreille, the retiring Auditor, also offers himself for re-election." On the motion of the Chairman, seconded by Sir Stephen Walcott, K.C.M.G., the report was unanimously adopted. The retiring Directors and Auditor were re-elected, and a vote of thanks passed to the Chairman. In responding, he asked the Shareholders to pass a vote of thanks to the Secretary, who, he said, had worked so admirably on the Company's behalf, and to Mr. Conrad (the Manager), for the vigilant care and untiring energy he displayed at all times. The Secretary acknowledged the compliment, and the proceedings terminated.

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

721.—WILSON, W. P., Brockley, Kent, "Improvements in apparatus used in the manufacture of gas, and for other purposes." Feb. 22, 1879.

740.—MORI, F., HALLEWELL, C. E., MILNER, W., and GRIFFIN, W., Leeds, "Improvements in electric lamps, and in the method of and apparatus for regulating or controlling the same." Feb. 24, 1879.

747.—NAWROCKI, G. W. VON, Berlin, "Improvements in lamps." A communication. Feb. 24, 1879.

750.—SIMON, H., Manchester, "Improvements in vapour or gas motor engines." A communication. Feb. 25, 1879.

751.—LAKE, W. R., Southampton Buildings, London, "Improvements in lanterns and lamps." A communication. Feb. 25, 1879.

767.—HALL, B. G., Malvern Wells, Worcester, "Improvements in hydrocarbon and other lamp-burners." Feb. 25, 1879.

775.—HENWOOD, F. G., and CHAPMAN, J. H., Budge Row, London, "Improvements in the manufacture of packing or the means employed for making tight joints in those parts of steam engines and boilers and hydraulic or other engines, apparatus, and appliances, and other cases where steam, air, gas, or water tight joints are required, which improvements are also applicable for other uses." Feb. 26, 1879.

783.—HARDING, G. P., Paris, "Improvements in obtaining electric light." Feb. 26, 1879.

Share List of Gas and Water Companies.

(Corrected by Mr. F. N. GOLDING, 23, Cornhill, from the latest Stock Exchange Quotations.)

Number of Shares issued.	Amount per Share.	NAME.	Amount paid up per Share.	Last Divd. p. Cent. p. Ann.	Latest Quotations.
	£	GAS COMPANIES.	£ s. d	£ s. d	£
589832	10	Alliance and Dublin	10 0 0	10 0 0	16–17
10000	20	Anglo-Romano . .	20 0 0	10 0 0	21–23
5000	20	Bahia (Limited). .	20 0 0	3 0 0	11–13
1000	20	Do., do., redeem.	20 0 0	10 0 0	25–27
1500	20	Do., 2nd pref. . .	20 0 0	7 10 0	20–22
40000	5	Bombay (Limited).	5 0 0	7 10 0	5¾–6¼
10000	5	Do., fourth issue.	4 0 0	7 0 0	¾–1 pm.
5000	20	Bournemouth . . .	10 0 0	7 0 0	..
229700	..	Brentford	100 0 0	9 0 0	145–150
..	..	Do., 5 per ct. pref.	100 0 0	5 0 0	93–96
..	20	Do., C shares . .	16 0 0	9 0 0	7–8 pm.
5400	20	Brighton	20 0 0	10 0 0	30–32
5000	20	Brighton and Hove	20 0 0	10 0 0	32–34
14000	20	British (Limited) .	20 0 0	10 0 0	34–35
7223	20	Cagliari (Limited).	20 0 0	7 0 0	16–18
1500	10	Colney Hatch . . .	10 0 0	5 0 0	8–9
55000	Sk.	Commercial	100 0 0	10 10 0	173–178
70000	Sk.	Do., 7 per cent. .	100 0 0	7 10 0	115–125
20000	20	Continental Union.	20 0 0	6 10 0	17¾–18¼
27000	20	Do., new	14 0 0	6 10 0	2¾–1⅞ dis
10000	20	Do., preference .	20 0 0	7 0 0	22–23
75000	Sk.	Crystal Palace Dist.	100 0 0	10 0 0	170–175
125000	Sk.	Do., 7 per cent. .	100 0 0	7 0 0	120–125
50000	Sk.	Do., preference .	100 0 0	6 0 0	115–120
7100	25	Edinburgh	25 0 0	10 0 0	46–48
23406	10	European (Limited)	10 0 0	10 0 0	15¼–16¾
12000	10	Do., new shares. .	7 10 0	10 0 0	¾–1¼pm
35406	10	Do., new shares .	5 0 0	10 0 0	2¾–3¼pm
4096300	Sk.	Gaslight & Coke A.	100 0 0	10 10 0	170–175
100000	Sk.	Do. B.	100 0 0	4 0 0	74–77
50000	10	Do. 5 per ct. pref. conv., 4th issue.	10 0 0	5 0 0	15¾–16¾
50000	10	Do. do., 5th do. .	10 0 0	5 0 0	15–16
200000	Sk.	Do. C 10 p.c. pref.	100 0 0	10 0 0	195–205
300000	„	Do. D do. do. .	100 0 0	10 0 0	195–205
165000	„	Do. E do. do. .	100 0 0	10 0 0	195–205
30000	„	Do. F 5 do. do. .	100 0 0	5 0 0	100–103
60000	„	Do. G 7½ do. do. .	100 0 0	7 10 0	145–158
1300000	„	Do. H	100 0 0	7 0 0	125–130
12500	5	Georgetown, Guiana	5 0 0	7 0 0	..
300000	100	Glasgow Corporation Gas	100 0 0	9 0 0	205–210
115000	100	Do., do.	100 0 0	6 15 0	155–160
..	100	Grimsby Gas, A. .	100 0 0	..	183–188
..	10	Hampton Court . .	10 0 0	10 0 0	14–15
7800	10	Hong Kong (Lim.)	10 0 0	10 0 0	14–16
5000	10	Hornsey	10 0 0	10 0 0	13–14
20000	50	Imperl. Continental	100 0 0	5l.p.sh.	165–170 xd.
..	..	Kingston	..	..	..
..	..	Lea Bridge	..	..	..
9000	4	Limerick Gas . . .	4 0 0	3 15 0	2–2¼
561001.	100	Liverpool United .	100 0 0	..	180–185
169100l.	100	Do., B	100 0 0	7 0 0	125–135
386500l.	Sk.	London	100 0 0	10 0 0	173–178
150000l.	Sk.	Do., 1st pref. . .	100 0 0	6 0 0	122–125
8550	Sk.	Do., 2nd pref. . .	100 0 0	6 0 0	100–106
7622	25	Do., A shares . .	25 0 0	6 0 0	29–31
266921	Sk.	Do., Debent. stk.	100 0 0	5l.& 6l.	..
15000	5	Malta and Mediterranean (Limited).	5 0 0	2 10 0	1¾–2¼
6000	5	Do., preference .	5 0 0	7 10 0	5–6
20000	5	Mauritius (Limited)	2 5 0	3 6 8	1¾–1¼ dis
27696	20	Monte Video (Lim.)	20 0 0	8 0 0	14–15
8000	10	Nietheroy, Braz. (L.)	10 0 0	5 0 0	4–5
30000	5	Oriental (Calcutta).	5 0 0	9 0 0	6¾–7¼
30000	5	Do., new shares .	3 10 0	9 0 0	1–2 pm.
10000	5	Ottoman (Limited).	5 0 0	3 0 0	2–2¼
10000	10	Parà (Limited) . .	10 0 0	3 0 0	4¾–5¼
27000	20	Phœnix	20 0 0	10 0 0	34–36
3600001.	100	Do., new max. 7½	80 0 0	7 10 0	103–105
1440001.	Sk.	Do., capitalized .	100 0 0	5 0 0	95–100
..	..	Richmond (Surrey)	..	..	15–16
37500	20	Rio de Janeiro (L.)	20 0 0	10 0 0	23–25
1500	32½	Shanghai	32 10 0	12 0 0	..
..	100	Sheffield, A	100 0 0	10 0 0	192–194
..	100	Do., C	100 0 0	10 0 0	106–108
12500	5	Singapore (Limited)	5 0 0	7 10 0	5¼–5¾
2000	5	Do., preference .	5 0 0	7 10 0	5¼–6¼
4000	50	South Metropolitan	50 0 0	11 10 0	95–100
4000	12½	Do.	12 10 0	11 10 0	23–25
20000	12½	Do., new shares .	12 10 0	11 10 0	23–25 pm.
15000	10	Surrey Consumers.	10 0 0	10 0 0	16–18
10000	10	Do., new	8 0 0	10 0 0	6–7 pm.
..	5	Tottenham and Edmonton	5 0 0	10 0 0	7¼–8¼
1500	10	Wandsw. & Putney	10 0 0	10 0 0	14½–15
1500	10	Do.	10 0 0	7 10 0	10¾–11¾
4000	10	Do.	10 0 0	7 0 0	..
26000	5	West Ham	5 0 0	10 0 0	8–9
..	..	West Kent	..	..	13–14
..	..	Woolwich, Plmstd., and Charlton . .	..	10 15 0	..
		WATER COMPANIES.			
615600	100	Chelsea	100 0 0	6 0 0	150–153
1624700	100	East London . . .	100 0 0	6 0 0	150–152
10798	50	Grand Junction . .	50 0 0	5 0 0	81–85
5840	25	Do., ¼ shares . .	25 0 0	5 0 0	41–43
6160	25	Do., new ditto; max. div., 7½ p.c.	25 0 0	5 0 0	35–37
5551801.	100	Kent	100 0 0	8 0 0	207–215
781800l.	100	Lambeth	100 0 0	6 5 0	150–153
326150l.	100	Do., max., 7¼ p.c.	100 0 0	6 5 0	145–150
442	100	New River	100 0 0	7 0 0	320–350
4475	100	Do.	85 0 0	7 0 0	280–300
400000	100	Do., deb. sk., 4 p.c.	100 0 0	4 0 0	101–103
6663001.	100	Southwrk. & Vauxh.	100 0 0	4 0 0	109–112
324700l.	100	Do., pref. stock .	100 0 0	5 0 0	113–116
126501.	100	Do., D shares . .	100 0 0	4 0 0	107–109
700001.	100	Do., new ordinary	..	4 10 0	..
1600	100	Do., new ord. No. 1	40 0 0	4 10 0	..
15073	61	West Middlesex . .	61 0 0	6l.p.sh.	138–141

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

3397.—Kenyon, H., Warrington, Lancs, "Improvements in purifying coal gas, and in the manufacture of carbonate of ammonia, ammoniacal salts, and carbonate of soda." Aug. 28, 1878.

3422.—Tasker, J. W., Halifax, Yorks, "Improvements in illuminating apparatus applicable to street lamps and other gas-burners." A communication. Aug. 29, 1878.

3444.—Cropper, J., and Johnson, W., Nottingham, "Improvements in valves for gas-engines." Aug. 30, 1878.

3470.—Harbison, C. W., South Kensington, London, "Improvements in obtaining light by electricity, and in the means or apparatus employed therein." Sept. 2, 1878.

3472.—Gedge, W. E., Strand, London, "An improvement in stoves or apparatuses heating by gas." A communication. Sept. 2, 1878.

3474.—Groth, L. A., Stockholm, "Improvements in the construction of gas-burners." A communication. Sept. 2, 1878.

3488.—Gedge, W. E., Strand, London, "Improvements in suspending and adjusting sliding gaseliers or gas apparatuses." A communication. Sept. 3, 1878.

3663.—Wise, W. L., Adelphi, London, "Improvements in the construction and working of gas blast-furnaces, and in the method of producing gas for the same and other purposes." A communication. Sept. 17, 1878.

4843.—Foulis, W., Glasgow, "Improvements in gas and hydrocarbon engines, and in igniting the gas or hydrocarbon used therein, the means of igniting being applicable for other purposes." Nov. 28, 1878.

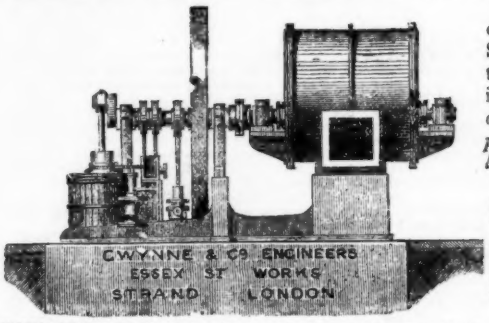
5139.—Brain, W. B., St. John's Wood, London, "Improvements in apparatus for the production and application of electricity for lighting and other purposes." Dec. 14, 1878.

5152.—Whyte, G., Elgin, N.B., "Improvements in electric lamps or lights, and in the electrodes and appliances connected therewith." Dec. 16, 1878.

5306.—Edison, T. A., New Jersey, U.S.A., "Improvement in means for developing magnetism and electric currents, and in apparatus for illuminating by electricity." Dec. 28, 1878.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

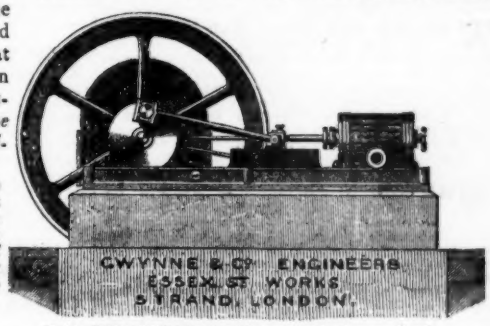
GWYNNE & BEALE'S PATENT GAS-EXHAUSTERS & ENGINES.



EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 8,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



52,500 EXHAUSTER, with Horizontal Engine combined.

GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas WITHOUT OSCILLATION OR VARIATION IN PRESSURE Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers, ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

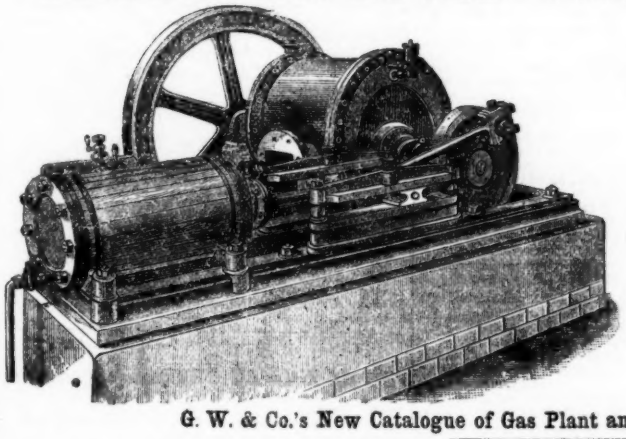
Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

BEALE'S IMPROVED PATENT GAS EXHAUSTERS

WITH

Wrought-Iron Spindles and

ENGINES COMBINED.



SOLE MAKERS,

GEORGE WALLER & CO.

MAKERS OF ENGINES, EXHAUSTERS, INDEX AND DISC GAS-VALVES, HYDRAULIC MAIN VALVES, BYE-PASS VALVES, TAR, LIQUOR, AND OTHER PUMPS, SCRUBBERS AND PURIFIERS, CONDENSERS, BOILERS, &c.

G. W. & Co.'s New Catalogue of Gas Plant and Machinery can be had on application.

Phœnix Engineering Works:

HOLLAND STREET, SOUTHWARK, S.E.

THE IMPERIAL METER COMPANY, LIMITED,

MANUFACTURERS OF EVERY DESCRIPTION OF WET AND DRY GAS-METERS,

Invite the attention of Gas Companies to their

DRY METERS,

As combining best quality and unusual strength of Materials, superior Workmanship, and the many improvements in detail suggested by lengthened experience in this manufacture.

WORKS: KING'S ROAD, ST. PANCRAS, LONDON.

WANTED, a Situation as Retort-Setter. Has no objection to going abroad. Or a situation in the county. Seven years in last employment.

Address No. 529, care of Mr. King, 11, Bolt Court, Fleet Street, LONDON, E.C.

WANTED, by the Advertiser, a Situation as FITTER, Main and Service Layer, and Meter Inspector, or the Management of Works. Has a thorough knowledge of the whole routine of Gas-Works, having had many years experience.

Address No. 528, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a young Man, aged 23, who has had five years experience in a Provincial Works (make, 75 millions), a SITUATION in a Gas-Works. Can use Photometer, fair Draughtsman, good Writer, quick at figures, and thoroughly understands general routine.

Address No. 527, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Situation as Gas Manager. Had over 20 years experience, and 8¼ years in present employment. Understands all branches connected therewith. Good testimonials. Satisfactory reason for change.

Address No. 522, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Young Man (married), a Situation as MANAGER, or Secretary and Manager, of a small Gas-Works, or Assistant in a larger one. Has had considerable experience in the Manufacture and Distribution of Gas in all its branches; five years sole Manager. No objection to any place in the United Kingdom. Satisfactory reasons for change. Unexceptional references and testimonials.

Address, in first instance, No. 526, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED.—A Foreman is wanted by the Richmond (Surrey) Gas Company. His duties more especially will be to take the entire superintendence of the Carbonizing Department, and to take charge of the Works during the absence of the Engineer. None need apply who have not had considerable experience in Gas-Works.

Applications to be made in writing, stating age, past experience, and wages required, to be addressed to the Chairman of the Richmond Gas Company, Gas-Works, Richmond, SURREY, not later than March 12, 1879.

TO GAS-FITTERS.

WANTED, an active Young Man as Assistant GAS-FITTER; able to Fix Meters, attend to consumers complaints, do ordinary Fitting-Work, and Lay Services, &c. To work under an experienced Fitter. Must have had some experience of similar duties. One from the Provinces preferred. Wages to commence at 26s. per week, and the engagement will be permanent for an efficient man.

Apply, with copies of testimonials as to character and abilities, to Mr. W. T. CARPENTER, Manager, Sheppy Gas Company's Works, West Minster, near SHEERNESS.

BOROUGH OF SOUTHPORT.

WANTED, a Gas Manager. He will be required to devote the whole of his time to the duties of his office, and to reside at Crowlands Gas-Works. House, coals, gas-rates, and water free.

Applicants must state age, experience, and salary required. The annual make of gas is about 170 million cubic feet. Duties to commence 1st of May next. Personal canvassing not allowed.

Applications, endorsed "Gas Manager," must be forwarded to me on or before March 22, 1879.

By order,
KEIGHLEY WALTON, Town Clerk.

THE Committee of the Gas Commissioners, Inverness, are prepared to receive TENDERS for Two PURIFIERS, 12 feet square, with Covers and Lifting Gear complete.

Plans and specifications to be seen with Mr. James Thomson, Manager.

Sealed tenders endorsed "Tender for Purifiers," to be lodged and addressed to the MANAGER, will be received up to Monday, the 24th of March.

Gas-Works, Inverness, Feb. 28, 1879.

MANCHESTER CORPORATION GAS-WORKS.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Gas Committee will receive, not later than the 25th day of March next, TENDERS of GAS COAL of approved quality for delivery at their Works, situated at Gaythorn and Rochdale Road, over a period of One or more years, commencing from the 30th day of June next, and the Committee are now prepared to receive applications for permission to submit samples of the material proposed to be offered.

Sealed tenders, stating price and quantity proposed to be delivered at each works, and the rate and period of delivery, and endorsed "Tender of Gas Coal," must be addressed to the Chairman of the Gas Committee, and delivered at his office on or before Tuesday, the 25th day of March next.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
JOSEPH HERON, Town Clerk.

Town Hall, Feb. 28, 1879.

TO COLLIERY-OWNERS, COAL FACTORS, AND OTHERS.

THE Directors of the Rochester, Chatham, and Strood Gaslight Company are prepared to receive TENDERS for the Supply of GAS COALS for One, Two, or Three years from the 1st of June next, according to particulars which may be had on application at the office, 56, High Street, Rochester. The quantity required will be 21,000 tons per year.

Tenders (on the Company's form, and marked "Tender for Coals") must be at the office before noon of Thursday, March 20, 1879.

W. SYMS, Secretary.

RAMSGATE LOCAL BOARD.

THE Gas and Water Committee of the Ramsgate Local Board are prepared to receive TENDERS before the 13th inst., for a supply of soft CAKING COALS of the best quality for gas manufacture for One or Two years, delivered into ships in the Tyne or into carts on the quay of Ramsgate Harbour.

The quantity required for the first year is 8500 tons, second year 9500 tons.

Further particulars, with forms of tender, can be obtained on application to Mr. William A. Valon, Engineer and Manager of the Ramsgate Gas and Water Works, Hardres Street.

The Committee do not bind themselves to accept the lowest or any tender.

W. A. HUBBARD, Clerk of the Local Board.

March 1, 1879.

TO GAS ENGINEERS.

THE Bury St. Edmund's Gas Company invite TENDERS for the Supply and Erection of the following Gas Apparatus, viz.:—

Set of Four PURIFIERS, each 10 ft. by 10 ft., by 4 ft. deep, with Centre-Valve complete.

SCRUBBER capable of thoroughly removing the ammonia from 20,000 cubic feet of gas per hour. Firms tendering for this are requested to supply tracing of the form of Scrubber for which they tender.

The price for Scrubber to include Inlet, Outlet, and Bye-Pass Valves, and Connections.

Particulars may be learned on application to the undersigned, with whom tenders must be lodged, not later than the 13th inst.

JOHN M'CRAE, Engineer and Manager.

Bury St. Edmund's, March 1, 1879.

EXETER GASLIGHT AND COKE COMPANY.

TO CONTRACTORS.

THE Directors of the above Company are prepared to receive TENDERS for two 24 ft. square PURIFIERS, also two 20 by 16 ft.

Further particulars may be obtained on application to the Engineer at the Basin Gas-Works, and sealed tenders to be sent to me, the undersigned, on or before Saturday, the 15th day of March next.

The Directors do not pledge themselves to accept the lowest or any tender.

By order,
W. A. PADFIELD, Secretary.

Gaslight Offices, Exeter, Feb. 20, 1879.

TENDERS FOR ALTERATION OF AND ADDITIONS TO GAS SCRUBBERS.

THE Gas Committee of the St. Helen's Corporation invite TENDERS for the Alteration and Enlargement of Two Scrubbers, now erected at the St. Helen's Gas-Works, from their present size—viz.: 24 ft. high by 8 ft. diameter, to 48 ft. high.

To be filled with Boards, and provided with Machinery-Room, Water Distributor, Spiral Staircase, &c., as per plans and specifications; which may be seen, and all necessary information obtained, from the Engineer upon the Works.

Sealed tenders, endorsed "Tender for Scrubbers," and addressed to the Chairman of the Gas Committee, to be delivered to the undersigned, at the Gas Office, Warrington Old Road, St. Helen's, not later than Monday, the 10th day of March.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
E. DYSON, Secretary.

BOROUGH OF FROME WATER-WORKS.

THE Local Board for the district of Frome, acting as the Urban Sanitary Authority, are prepared to receive TENDERS for the Execution of the following Works at or near Frome, in Somersetshire:—

Contract No. 2.—The Laying and Jointing of about 19,000 yards of Cast-Iron Main-Pipes, varying from 10 inches to 3 inches diameter.

Contract No. 3.—The Manufacture and Erection of Two High-Pressure Condensing Steam-Engines, with Boilers, Pumps, and other appurtenances.

Specifications and forms of tender, as well as bills of quantities for contract No. 2, can be obtained (on payment of one guinea for each contract, which will be returned on receipt of a *bonâ fide* tender), and drawings, relating to contract No. 2, can be seen at my Office in Frome, or at the Office of the Engineer, Mr. Henry Tomlison, 4, Bene't Street, Cambridge; and sealed tenders endorsed respectively, "Tender for Laying Pipes," or "Tender for Pumping Machinery," as the case may be, must be delivered to me not later than Twelve o'clock at noon on Wednesday, the 5th day of March next.

The Board do not bind themselves to accept the lowest or any tender.

GEO. W. BRADBURY, Clerk to the Board.

Bath Street, Frome, Somerset, Feb. 18, 1879.

TO IRONFOUNDERS.

THE Water-Works Committee of the Heywood Local Board invite TENDERS for the Supply of Turned and Bored IRON PIPES, as follows:—

2000	Yards	12 inches.
1000	„	10 „
1500	„	8 „
1000	„	6 „
1000	„	4 „

Specifications may be seen and further information obtained on application to Mr. James Diggle, Water-Works Manager, Miller Street, Heywood.

Tenders to be sent in addressed to the Chairman, and endorsed "Tender for Pipes," not later than 6 p.m. on Monday, the 17th of March next.

The Committee do not bind themselves to accept the lowest or any tender.

JNO. BANKS, Clerk to the Local Board.

Office of the Local Board, Heywood,
Feb. 28, 1879.

TENDERS FOR GAS COAL AND CANNEL.

THE Gas Committee of the St. Helen's Corporation invite TENDERS for a One and Two years Supply of GAS COAL and CANNEL from the 1st of July next—viz:

For the year ending June 30, 1880—
6000 tons of Coal and 4400 tons of Cannel.
For the year ending June 30, 1881—
7500 tons of Coal and 4600 tons of Cannel.

The monthly deliveries of coal not to exceed 1200 tons or to be less than 300 tons, and the monthly deliveries of cannel must not exceed 700 tons, or be less than 240 tons.

To be delivered at the Gas-Works, St. Helen's (into which there is a siding from the London and North-Western Railway), in such weekly quantities as may from time to time be specified, in writing, by the Manager of the Gas-Works.

The coal and cannel to be the best of their respective kinds; to be well screened and free from all dirt and refuse.

Sealed tenders, stating the net price per ton for each period, properly endorsed, and addressed to the Chairman of the Gas Committee, to be delivered to the undersigned, with an analysis of the coal and cannel offered, not later than Monday, the 10th day of March.

The Committee do not bind themselves to accept the lowest or any tender. By order.

EDWARD DYSON, Secretary.

Gas Office, Warrington Old Road,
St. Helen's, Feb. 19, 1879.

SURREY CONSUMERS GAS COMPANY.

NOTICE is hereby given that the HALF-YEARLY ORDINARY GENERAL MEETING of the SHAREHOLDERS of this Company will be held at the Terminus Hotel, London Bridge, Southwark, on FRIDAY, the 4th day of April next, at Three o'clock in the afternoon precisely, to receive the Directors Report for the Half Year ending 31st of December last, to declare a Dividend, and to elect Two Directors in the room of Col. Beresford, M.P., and John Liddle, Esq., who offer themselves for re-election; and of One Auditor in the room of Nathaniel James Powell, Esq., who also offers himself for re-election.

The Books for the Transfer of Shares will be closed on the 20th of March, until the day of meeting.

W. P. BODDY, Secretary.

Rotherhithe, Feb. 21, 1879.

GODALMING GAS-WORKS.

A Set of three 6 ft. square Purifiers, Sieves, Lifting Gear, and Centre Valves, all complete, in good condition, and has been in full work up to last summer, made by Cockey and Son, Engineers, Frome, is now for Sale cheap. Larger ones having been erected, is the cause of their being sold.

For further particulars, apply to Mr. A. COLPUS, Gas-Works, GODALMING.

STOCK OF THE BRISTOL UNITED GASLIGHT COMPANY.

MESSRS. H. R. FARGUS & CO. will SELL by AUCTION, in pursuance and under the provisions of the Bristol United Gas Company's Act, 1873, at their Saleroom, 4, Clare Street, in the City of Bristol, on Thursday, March 20, 1879, at Two o'clock precisely, £20,000 CAPITAL STOCK, issued by them under the authority of the above-named Act.

The Stock will be Sold in Lots of £100 each.

For Conditions of Sale, and any further particulars, apply to the AUCTIONEERS, Clare Street, Bristol; to the SECRETARY of the Company, Canons Marsh, Bristol; or to Messrs. BRITTAN, LIVETT, BOX, AND CO., Solicitors, Albion Chambers, Bristol.

WESTON-SUPER-MARE GASLIGHT AND COKE COMPANY.

TO BE SOLD BY TENDER, a quantity of GAS PLANT suitable for a medium-sized Gas-Works, consisting of a 30 ft. Gasholder, together with one Station-Meter. Capacity, 5000 ft. per hour, with three 8-in. Valves and connections complete.

Set of Six PURIFIERS, 9 ft. by 6 ft., and 3 ft. 6 in. deep, with Trays and two Centre Valves complete. Two Columns, two Guides, and frame belonging thereto.

One SCRUBBER, 8 ft. by 7 ft., with Iron Trays, Centre Table, and other necessary connections.

One 8-in. GOVERNOR, and also a quantity of piping and other miscellaneous articles.

The above are to be disposed of in consequence of recent extension and enlargement of the works.

Tenders to be sent addressed to the Secretary, and the Directors do not pledge themselves to accept the lowest or any tender

For further particulars apply to Mr. John Perry, Manager, or to W. H. DAVIES, Solicitor, Secretary.

TO GAS ENGINEERS.

D. BRUCE PEEBLES & CO.

Beg to call the attention of Gas Engineers to the fact that the novel and original feature in connection with PEEBLES' SYSTEM OF CONTROLLING THE ACTION OF GAS GOVERNORS is the loading or acting on the Bell by Pneumatic Pressure instead of Weights.

TAY WORKS, BONNINGTON, EDINBURGH.

A. FAIRLIE WILSON,
CONSULTING GAS ENGINEER,
34, ST. GEORGE'S ROAD, SOUTHWARK, S.E.
Reports and Valuations in the Management, Construction, and Structural Value of Gas-Works.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.
For particulars, price, &c., apply to Mr. E. Price, Inventor and Patentee, Gas-Works, Hampton Wick, Middlesex.
Prices are Reduced.

PORTBURY, PATERSON, & CO.,
MANUFACTURERS OF
Improved Wet and Dry Gas-Meters,
ALSO PATENTEES OF
COMPENSATING WET METERS;
INDICATORS,
STATION AND TEST METERS TO ORDER
STREET-LAMPS AND FITTINGS.
WORKS: WATERBEER ST., EXETER

WANTED, Readers of the NEW Edition, 1879, "Cooking & Heating by Gas;" on Burners, &c. Copies, by post, Threepence, direct from the Author, Magnus Ohren, A.I.C.E., Gas-Works, Sydenham, S.E.

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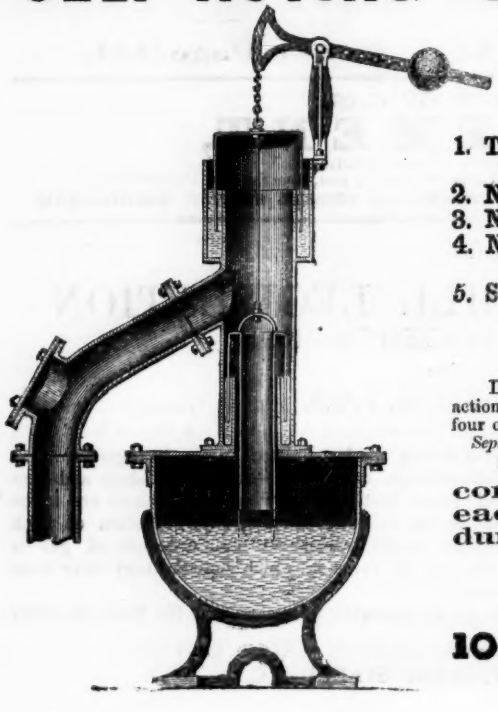

ADVANTAGES.

1. There is no pressure on the Retorts.
2. No deposit of Carbon.
3. No scurfing is required.
4. Never a choked Ascension-Pipe.
5. Saves Fuel and Wear and Tear.
6. Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
7. Is never out of order.
8. Requires no attention.
9. Is perfectly automatic in its action.

Testimonial from the Proprietor of the Apeldorn Gas-Works.

DEAR SIR,—In reply to your inquiry, the Self-Acting Dip-Pipes, which have been in action at my works for two years, give entire satisfaction. I forward you order for four others.
Yours truly,
Sept. 9, 1877. R. BAKKER.

These Dip-Pipes can now be supplied complete, except the flanched bend, for £4 each, which includes the charge for licence during the whole term of the patent.

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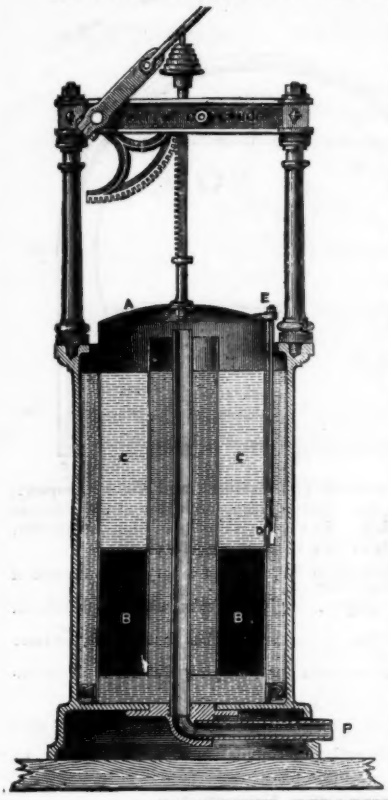

DESCRIPTION OF THE APPARATUS.

The illustration represents a section of the Patent Governor. The lower part of the Bell A is fitted with a loose Float B, and in the upper part of the Bell is a deep annular Water Chamber C, at the bottom of which is an opening D, with a slide outside regulated by a Screw Spindle E, to allow the water to pass in and out of the Chamber C quickly or slowly, according to circumstances, but when once adjusted the slide does **not require altering.** This Self-compensating Chamber gives great steadiness to the up and down movement of the Bell and effectively prevents the "hunting" motion so common with other Governors, thereby ensuring a more perfect action on the throttle-valve of the Engine **than attained by any other.** The sketch shows the clip lever fixed to work on throttle-valve at an angle, and can work in either direction. P is the Gas Inlet-pipe to Governor.

G. W. & Co. also make **special Steam Throttle Valves,** suitable for working with this Governor, and alter existing Throttle Valves to same plan.

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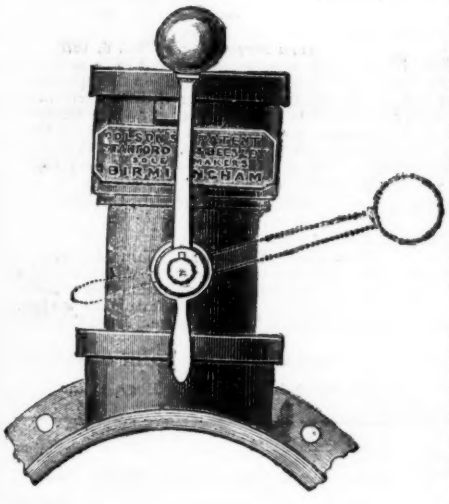
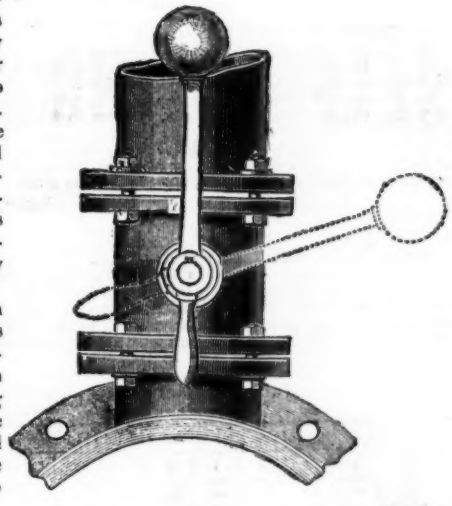
COLSON'S PATENT ASCENSION-PIPE THROTTLE-VALVE.



THIS Valve is designed to supersede the hydraulic seal, and is intended to be placed immediately in or on the retort mouthpiece, or at such a distance therefrom as to be within reach of the workman. By the use of these Valves, the whole of the pressure is removed from the retorts, and a largely increased make of gas per ton obtained; the deposit of carbon is very slight, choked ascension-pipes are unknown, and the quality of the coke is improved.

When the retort is being drawn or charged, the lever, which is attached to a Spindle and Throttle-Valve, is thrown over as shown by the dotted lines, thereby closing the ascension-pipe; but when the retort is sealed, the lever is placed in a vertical position, and a free way made for the gas to pass to the relieving main.



The Valves (upwards of two hundred in number) supplied to the Gas Committee of the Corporation of Birmingham, for their Windsor Street Works, continue to give complete satisfaction, and no difficulty has been experienced in working retorts fitted with them in combination with others worked in the usual way with the hydraulic seal.

The following important testimonial has been received:—

Corporation of Birmingham Gas Department, Windsor Street Works, Feb. 17, 1878.

MESSRS. STANFORD AND BEESLEY.

DEAR SIRS,—In reply to your inquiry, I beg to say that the Valves (Colson's Patent) supplied by you in July last have given entire satisfaction. The retorts fitted with them are worked side by side with others having the ordinary dip-pipe, without any difficulty being experienced.

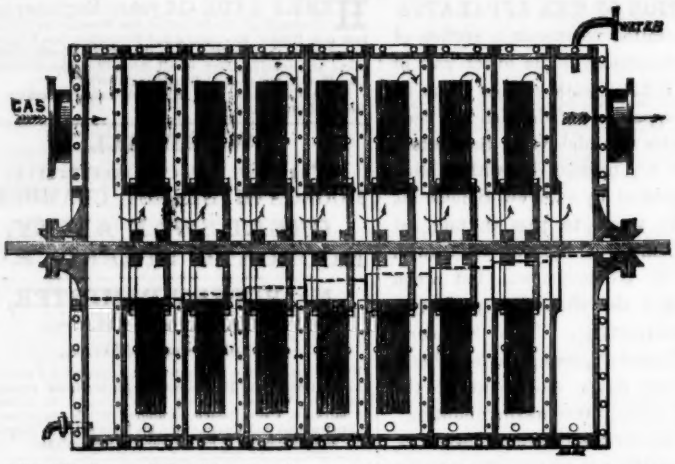
Yours truly, (Signed) CHARLES HUNT.

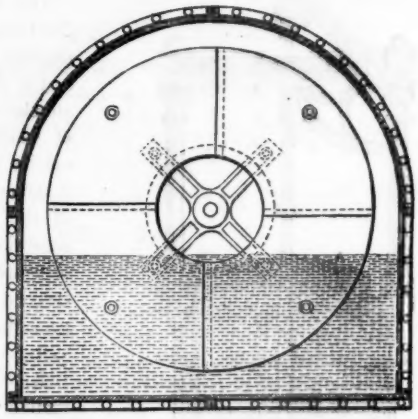
For further Particulars, apply to

Messrs. STANFORD and BEESLEY,
General Engineers and Sole Makers of COLSON'S PATENT ASCENSION-PIPE THROTTLE-VALVE,
89, DARTMOUTH STREET, BIRMINGHAM.

THE "STANDARD" WASHER & SCRUBBER.

[KIRKHAM, HULETT, AND CHANDLER'S PATENT.]





This Washer and Scrubber has been used for nearly two years on a large scale at the Works of The Gaslight and Coke Company, Bromley-by-Bow, at which station there are now several in operation and in course of construction. There is also one in use at the Pancras Station, King's Cross, of the same Company, which is purifying 1,500,000 cubic feet of gas per day. At the Gas-Works of the Corporation of Leeds, a large one has been erected, which is giving complete satisfaction. The Special Merits of this Washer are as follows:—

That it is a very effective Condenser, so that it is not absolutely necessary to reduce the temperature of the gas to 60°, or thereabouts, to make the Washer effective.

That the distribution of the liquor is made with unerring regularity.

That it occupies very small space, so that it can be, at little expense, effectually protected from extreme changes of the weather.

That the considerable expense of Coke or Wood, or other Scrubbing Material, is entirely saved, and that the great nuisance and cost of from time to time replacing the Scrubbing Material is avoided.

That, by the revolution of the discs, the quantity of water carried up by them, and tending continuously to fall, exposes a very large amount of fresh wetted surface to contact with the gas.

That it is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured.

That it is much cheaper than any other Scrubber that will do the same amount of work effectually.

That it is the only Washer suitable for purifying Gas from all its impurities by solution.

That it works with a minimum of pressure.

That it takes out every trace of Ammonia from the Gas in once traversing the machine.

That it requires very little outlay for foundations.

The following Testimonials show the opinion of eminent Engineers as to the capabilities of the Washer:—

(Copy.)
D. HULETT, Esq.

The Gaslight and Coke Company
Bromley-by-Bow, May 3, 1877.

Dear Sir,—In answer to your inquiries respecting the results of the working of your Patent Washer, I beg to state that I find it a very efficient machine. I have had it in operation for some time, and passed gas through it continuously at the rate of 100,000 cubic feet per hour, and obtained from it 11 gallons of 10 oz. liquor per ton of coal carbonized—results which appear to me very satisfactory for so small a Washer. It works very smoothly, taking but little power, and giving no pressure. I have it still in operation, and am perfectly satisfied with its working.

I am, dear Sir, yours truly, (Signed) W. B. WRIGHT.

(Copy.)
MESSRS. KIRKHAM, HULETT, and CHANDLER.

The Leeds Corporation Gas-Works,
York Street, Leeds, Dec. 6, 1878.

Gentlemen,—The Scrubber-Washer erected by you at these works, and which has been in use for six months, has proved to be, so far as we have been able to test it, thoroughly efficient. We are at present making 32,000 feet of gas per hour, and are entirely dependent on this apparatus for the removal of Ammonia, and the **Gas is perfectly free from that impurity in the sixth chamber**, so that four chambers remain to deal with an increasing make of gas. Owing to insufficient condensers, the gas was in the summer admitted to the Scrubber at a temperature of 70°, but was reduced therein to 61°, or that of the atmosphere. The volutes are driven at the rate of four revolutions per minute, and, working at that speed, there is not the slightest difference between the inlet and the outlet pressure. Clean water supplied at the rate of 10 gallons per ton of coal carbonized is converted into liquor of from 10 oz. to 13 oz. strength **in once traversing the vessel.** The apparatus is extremely simple and compact, occupies but little space, and requires no foundation. I shall be surprised if it does not eventually become extremely popular.

I am, Gentlemen, yours faithfully, (Signed) HENRY WOODALL, Engineer.

(Copy.)
MESSRS. KIRKHAM, HULETT, and CHANDLER.

The Gaslight and Coke Company.
York Road, King's Cross, Jan. 14, 1879.

Gentlemen,—In reply to your inquiry, I am pleased to say, the Washer which was put in action at this station in October last has quite fulfilled my expectations, as it confirms the experiments I made in May last with the smaller machine. Working at four revolutions per minute, **it takes out every particle of Ammonia**, while purifying more Gas than it was intended to do. I enclose particulars of a fortnight's working during our heaviest make, by which you will see that it yields the full quantity and strength of liquor, and works with little pressure. I am therefore quite satisfied with the machine, and trust it may meet with the success it deserves.

I remain, Gentlemen, yours truly, (Signed) JOHN CLARK.

The following Table shows the results of the working of one of these Washers, lately erected to purify 60,000 feet of Gas per Hour, at the St. Pancras Station of The Gaslight and Coke Company:—

1879.	Nos. of the Divisions and Strength of Liquor in each.										Water used per Ton of Coals.	Gas Purified per Hour, Cubic Feet.	Ammonia on Outlet.	Temperature.			Pressures.		Revolutions per Minute.
	1	2	3	4	5	6	7	8	9	10				Inlet.	Outlet.	Atmosphere.	Inlet, Inches.	Outlet, Inches.	
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.									
January 1	8½	6¾	5	3½	2½	1½	¾	¼	0	0	10 Gallons.	52,000	Nil.	77°	73°	48°	24	23	7½
,, 2	8¾	7	6	4½	3½	2½	1½	¾	¼	0	10 ,,	57,000	Nil.	78°	66°	32°	21¾	20¼	4
,, 3	9¼	8	6	3¾	3	2½	1½	¾	¼	0	10 ,,	60,000	Nil.	75°	68°	40°	23½	22	4
,, 4	9½	7¾	6¼	4¼	3¼	2¼	1¼	¾	¼	0	10 ,,	65,000	Nil.	74°	68°	33°	24	22½	5
,, 5	9½	7	6	4	3	2½	1½	1	¼	0	10 ,,	34,000	Nil.	77°	68°	35°	14½	14	5
,, 6	9½	7½	6½	4¼	3	2¼	1½	1	¼	0	10 ,,	63,000	Nil.	72°	66°	27°	24	22½	4½
,, 7	11	9	7	5½	3½	3	1¾	1¼	½	0	10 ,,	59,000	Nil.	74°	66°	31°	25	23½	5
,, 8	9½	7½	6	4½	3	2	1	¼	¼	0	10 ,,	78,000	Nil.	73°	61°	31°	28	26½	4½
,, 9	11	9	7	5	3½	2½	1½	1	¼	0	10 ,,	82,000	Nil.	74°	67°	33°	27½	25½	5
,, 10	10½	8½	6¾	5	3¼	2½	1½	1	¼	0	10 ,,	66,000	Nil.	76°	64°	28°	28½	27	5
,, 11	12½	10	7¾	5½	4¼	3½	1¾	1¼	½	0	10 ,,	61,000	Nil.	78°	64°	27°	26½	25¼	5
,, 12	11	8¾	6¾	—	—	—	1¼	¾	¼	0	10 ,,	39,000	Nil.	74°	64°	27°	26½	25¼	5
,, 13	13	10¾	8¼	6	4¾	3¼	2	1¾	¾	0	10 ,,	78,000	Nil.	73°	65°	42°	28	26	5

(Signed) JOHN CLARK, Engineer.

For further particulars and testimonials, address

Messrs. KIRKHAM & HERSEY, GAS ENGINEERS, 21, ABINGDON STREET, WESTMINSTER.

FOULIS'S PATENT GAS GOVERNORS

ARE APPLICABLE TO ALL PURPOSES FOR WHICH GAS GOVERNORS CAN BE USED.

They are *entirely covered in*, and therefore free from all risk of those accidents which are apt to occur with other Governors.

The form of the valve is such as to completely neutralize the effect of the inlet pressure. This, in combination with recent improvements, removes all tendency to oscillation.

These Governors in the STATION AND DISTRICT, as well as in the DIFFERENTIAL forms, may be placed anywhere under ground in the line of main. The former is under perfect and easy control, by means of the REGULATING VESSEL, while the latter may be weighted to any required amount, to maintain the desired difference between inlet and outlet pressure. Their action is all that can be desired.

These Governors have been supplied by us to the following Gas-Works:—

Ashburton (New Zealand), Barnet, Bristol, Bangor (Wales), Batley, Barrow-in-Furness, Birstal, Carlisle, Christchurch (New Zealand), Cork, Durham, Edinburgh, Edinburgh and Leith, Falmouth, Gloucester, Gibraltar, Halifax, Havana (Cuba), Huddersfield, Herne Bay, Ilford (Essex), Inverness, Imperial Continental Gas Association, Jersey, Kilmarnock, Keighley, Lewes (Sussex), Littleborough, Leeds, Lima (Peru), Londonderry, Monte Video, Newcastle-on-Tyne, Nantwich, Northfleet, Over and Wharton (Winsford), Oswaldtwistle, Penmaenmawr, Phœnix (London), Phœnix (Greenwich), Paisley, Penicuick, Penrith, Romford, Ryde (Isle of Wight), Spennymoor, Stalybridge, South Shields, Stratford-on-Avon, Salford, Stockton-on-Tees, Sheffield, Sowerby Bridge, South Metropolitan (London), Sedbergh, Sherborne, Stanhope, Ulverstone, Warwick, Wigan, Yeovil.

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Prices . . .	£4	£6	£8	£10	£12	£14	£16	£18	£20	£24	£35	£37 10s.	£40	£15	£50	£60	£75	£90	£105	£120

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J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. Sugg & Co, GHENT, will receive immediate attention.

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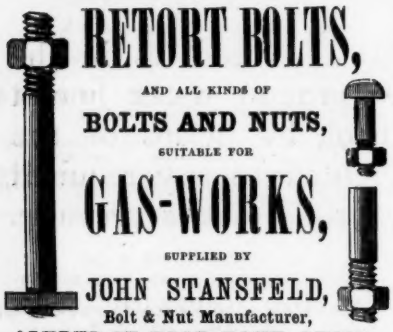
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.



RETORT BOLTS,
AND ALL KINDS OF
BOLTS AND NUTS,
SUITABLE FOR
GAS-WORKS,
SUPPLIED BY
JOHN STANSFELD,
Bolt & Nut Manufacturer,
ALFRED ST., BOAR LANE, LEEDS.

TORBAY AND DART PAINT COMPANY, LIMITED.

WORKS:
DARTMOUTH & BRIXHAM (TORBAY) DEVON.
OFFICES:
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SOLE PROPRIETORS AND MANUFACTURERS OF
WOLSTON'S CELEBRATED
TORBAY IRON PAINTS.

TRADE MARK

These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Wagon Works, and the Paint Trade generally. They are the BEST PROTECTORS of WOOD, CEMENT, and IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to iron. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only to be thinned down for use in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
Dart Yellow.	Buff.
Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead Colour.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

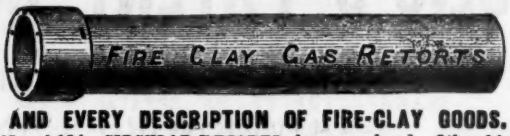
All other Colours made to order.

READY-MIXED PAINTS.

A great variety of Colours ready mixed for the brush are also always kept in Stock, in 3 lb., 7 lb., 14 lb., and 28 lb. cans.

Prices and Testimonials on application.

JOHN HALL AND CO., STOURBRIDGE,
Manufacturers of FIRE-BRICKS, LUMPS, TILES,



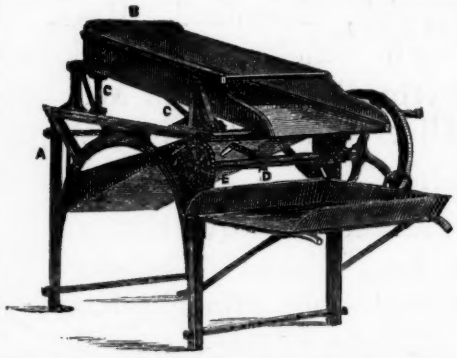
AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.
N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

BEST GAS COALS
DIRECT FROM THE
MARQUESS OF LONDONDERRY'S COLLIERIES,
COUNTY OF DURHAM.
For Prices and Particulars, apply to
MR. S. J. DITCHFIELD,
LONDONDERRY OFFICES, SEAHAM HARBOUR, COUNTY OF DURHAM.

J. & H. ROBUS,
BUILDERS AND CONTRACTORS
FOR THE ERECTION AND REBUILDING OF GAS AND WATER WORKS,
RETORT-SETTING—A SPÉCIALITÉ.
ROBUS'S IMPROVED RETORT-SETTINGS, guaranteed to Carbonize a large amount of Coal with a small per cent. of Fuel.
ESTIMATES GIVEN FOR MAIN-LAYING.
N.B.—All kinds of Fire Goods and Gas Apparatus supplied on the shortest notice.
Address:—J. & H. ROBUS, BELL GREEN, CATFORD, LONDON, S.E

PATENT
MACHINE-MADE RETORTS.

B. GIBBONS, JUN.,
STOURBRIDGE.



PRICE'S PATENT
LABOUR-SAVING SCREEN OR SIFTER.

In screening breeze, the coarse material falls on a tray supported by the handles of the Machine, thus making it convenient for picking the clinkers from the same, whilst the fine falls on a shoot behind, which is fixed to the bottom of the sieve B. In screening gravel or other material, the coarse will fall into a barrow direct, and the fine be conveyed by the shoot into a barrow at the other end, or at the bottom.

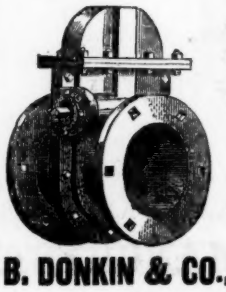
To practical men the advantages of this Machine will be evident. It secures at once a saving of time, labour, and expense, as by it a much greater quantity of material can be sifted in the same space of time.

Further particulars as to price, &c., may be obtained by applying to the Patentee (Hampton Wick), or to

ROBERT DEMPSTER & SONS,
(SOLE MANUFACTURERS),
ELLAND, NEAR HALIFAX.

B. DONKIN & CO.'S
IMPROVED GAS-VALVES
WITH WROUGHT-IRON PINIONS.

TRADE MARK



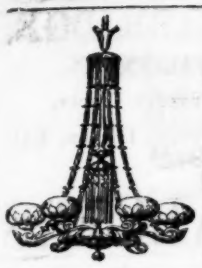
List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.

These Valves are proved on both sides to 30 lbs. on the square inch before leaving the works, and are kept in stock.

In ordering Valves, please state whether required for under or above ground, and if to be with flanges or spigots and sockets cast on, or with separate spigot and socket pieces.

ALSO SOLE MAKERS OF
J. BEALE'S NEW PATENT GAS EXHAUSTERS,
AND MAKERS OF
STEAM-ENGINES FOR DRIVING GAS EXHAUSTERS,
VALVES FOR AMMONIACAL LIQUOR,
IMPROVED BRIDGE VALVES FOR REGULATING THE SEAL IN HYDRAULIC MAINS,
BYE-PASS VALVES, SCREW WATER-VALVES, &c.

B. DONKIN & CO., 55a BLUE ANCHOR ROAD, BERMONDSEY, LONDON, S.E.



F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

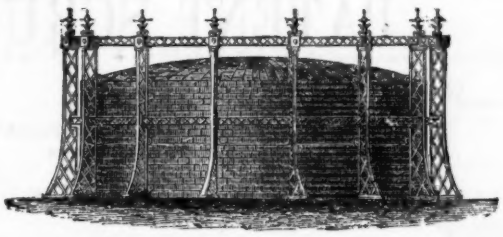
ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS.

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

S. OWENS & CO.,

WHITEFRIARS STREET, FLEET STREET, LONDON, E.C.,

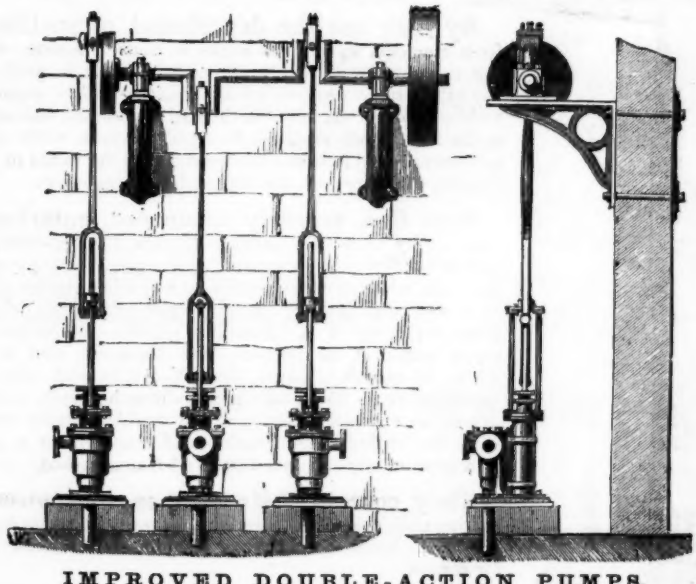
Hydraulic Engineers,

AND MANUFACTURERS OF

PUMPING MACHINERY of every Description.

SOLE LICENSEES AND MANUFACTURERS FOR GREAT BRITAIN OF

BLAKE'S PATENT DIRECT-ACTING STEAM-PUMPS.



IMPROVED DOUBLE-ACTION PUMPS.

For Water. For Tar. For Ammoniacal Liquor.

This Illustration shows an arrangement of three (No. 179) Improved Double-Action Pumps driven from the same crank-shaft, as frequently supplied for use in Gas and Chemical Works. The suction and discharge pipes can be arranged for drawing from and delivering in any required direction.

These Pumps have been supplied to nearly all the large Gas Companies and Chemical Works, both for Pumping Water, Tar, and Ammoniacal Liquor.

AS SYPHON PUMPS, IN COPPER OR SHEET IRON, ALWAYS IN STOCK.

Illustrated Catalogues sent post free on application.

YEO'S PATENT ENGINE PACKING,

Price 1s. 8d. per lb., any size.

Tarred & White Spun Yarn for Pipe Joints, at various prices.

Samples and testimonials free per post.

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MANUFACTURERS OF

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COTSWOOD FIRE-BRICK WORKS, SCOTSWOOD-ON-TYNE.

Also Makers of all kinds of Common Building Bricks, and of Pressed White and Red Bricks for Facing.

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TAR DISTILLERS & MANUFACTURING CHEMISTS,

MILES PLATTING, MANCHESTER.

BRANCH WORKS, BLACKBURN.

BUYERS OF COAL TAR,

And Crude Products therefrom,

AMMONIACAL LIQUOR, &c.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,

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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

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ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Keep in London and at their works large stocks of PIPES and CONNEXIONS (1¼ to 36 inches in diameter); also make and supply Retorts, Tanks, Columns, Girders, Special Castings required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

CHARLES HORSLEY, Agent.

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SILICA FIRE-BRICK CO.,

OUGHTIBRIDGE

Near SHEFFIELD,

Manufacturers of THE ORIGINAL SILICA OR DINAS FIRE-BRICKS. Specially adapted for Gas-Retort Furnaces and for Siemens's Gas-Furnaces. Shipments promptly executed to London, Liverpool, Hull, Grimsby, &c.

TROTTER, HAINES, & CORBETT,

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FIRE CLAY & BRICK WORKS,

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Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.

Successors to

E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

HARPER & MOORES,

PROPRIETORS OF THE

BEST STOURBRIDGE CLAYS,

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Manufacturers of all Descriptions of

BEST STOURBRIDGE FIRE-BRICKS, LUMPS AND CLAY RETORTS

Of all Dimensions for Gas-Works,

GLASS-HOUSE POTS & CRUCIBLES

ESTABLISHED 1836.

The Highest Award was obtained by H. & M., at the Philadelphia Exhibition, 1876, for Superior Quality of Manufacture. SILVER MEDAL, PARIS, 1878.

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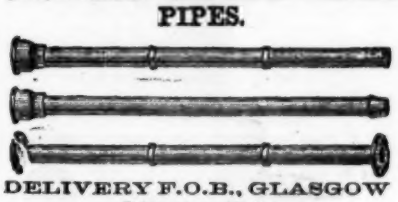
WILLIAM MACLEOD & CO.,

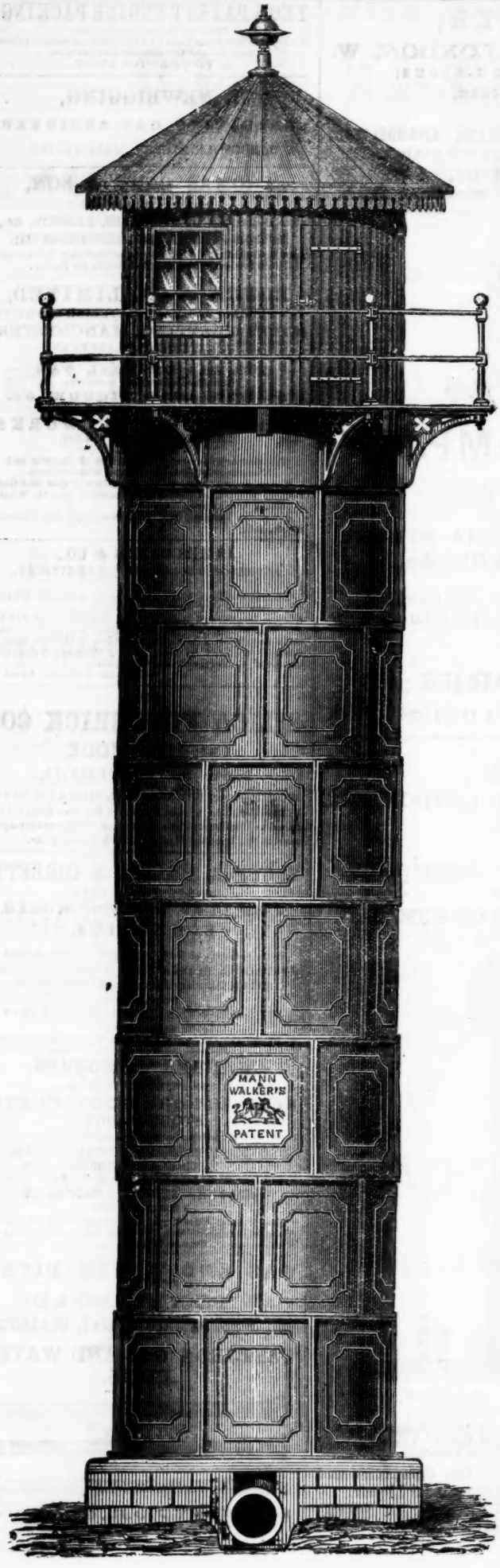
23 & 25, OSWALD STREET, GLASGOW.

CAST-IRON GAS AND WATER PIPES.



DELIVERY F.O.B., GLASGOW

Prices on application.



C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the important results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

Fifty million cubic feet of gas per 24 hours are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

Generally, wherever a high standard of purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to MR. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

GEORGE BRAY & CO.,

BLACKMAN LANE, LEEDS.

In consequence of the demand for Burners of extra Power for Lighting Large Spaces, we have introduced Burners of SIXTY and EIGHTY-Candle Power, which give from FIFTEEN to TWENTY per Cent. more Light per cubic foot of Gas consumed than any Flat-Flame Burner hitherto introduced.

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GAS-BURNER WORKS,

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SHOTT'S BOGHEAD.

HARTHILL CANNEL

Yields 14,920 cubic feet of 40·92-candle gas per ton.

THRASHBUSH CANNEL

12,530 cubic feet of 40·22-candle gas per ton, and 9 cwts. of good coke.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash. This cannel is almost free from sulphur.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full analyses on application at above address, or from WEDDERSPOON, FERGUSSON AND CO., 21, Lime Street, LONDON, E.C.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

HEBBURN MAIN GAS COALS.

T. Stone, Esq., of Weymouth, writes on Nov. 17, 1876: "I have used about 12,000 tons of this Coal, with, I think, the best possible results, although not always under the most favourable circumstances. My Coal account made up to Midsummer last showed a makeage of 10,524 cubic feet per ton of 14½-candle gas, and not a hundredweight of Cannel used. This statement would, I know, be incredible to many men, and may provoke the remark, 'How much of it is paid for?' For the gratification of such, I have to say that, of the above quantity, 9866 cubic feet per ton of Coal carbonised were brought to charge and duly paid for, with the exception of about 6s. per cent. for bad debts. The coke is of excellent quality. The above facts I hold to be a greater recommendation to your Coal than any words of mine could be."

PRICES ON APPLICATION, EITHER F.O.B. OR BY RAIL IN TRUCK LOADS.

THE TYNE COAL COMPANY, LIMITED, OWNERS.
W. RICHARDSON, Fitter,
29, QUAYSIDE, NEWCASTLE-ON-TYNE.

HOLMSIDE GAS COALS.

South Metropolitan Gaslight and Coke Company,
589, Old Kent Road, London, S.E.,
Oct. 9, 1873.

At the request of Mr. Hedley, the owner of the Holmside Colliery, I have much pleasure in stating that, for about ten or twelve years past, this Company has taken at least half of its supply of Newcastle Coal from him. I can, therefore, confidently bear testimony to the good quality of the Holmside Coals, and consider they are equal to the best of the Newcastle Coals, in proof of which I may state that this year we are using those Coals exclusively, that the yield of Gas is from 9700 to 9800 feet per ton, and that the quality of the Gas, without any admixture of Cannel, is over 16 candles, as tested by the officer appointed by the Metropolitan Board of Works, using the London Gas Referees test.

The Coke is of excellent quality, and in quantity amounts to about 40 bushels from a ton of Coal.

The annual consumption of Coal amounts to about 75,000 tons.

GEORGE LIVESEY, Engineer and Secretary.

P.S.—I am at this date, Feb. 15, 1875, still using Holmside Coals as largely as ever, and am quite as well pleased with them as when I gave the above certificate.

GEORGE LIVESEY.

We are this year, 1878, using 80,000 tons of Holmside Coal. GEORGE LIVESEY.

FITTING OFFICE:
Address, 75, QUAYSIDE, NEWCASTLE-ON-TYNE

M. BREMOND'S NAPHTHALINE PROCESS.

Negotiations respecting M. Brémond's patented process for preventing Deposits of

NAPHTHALINE

in Gas Main and Service Pipes should be addressed to Mr. W. H. BENNETT, 22, Great George Street, WESTMINSTER, S.W., or to M. BREMOND, Gas Engineer, Compania Madrilena de Alumbrado y Calefaccion por Gas, MADRID, who may be consulted upon all matters connected with the Gas Industry.

FERRAND DAVIES,

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AGENT FOR
THOMAS BARR'S LESMAHAGOW MAIN CANNEL,
AND
NEWTON, CHAMBERS, & CO.'S SILKSTONE GAS COALS.

Analyses and Quotations on application.

WILSON CARTER AND PEARSON,
GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

Address—CHIEF OFFICES:
TEMPLE BUILDINGS, 50, NEW STREET, BIRMINGHAM.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

35A, GREAT GEORGE STREET,
WESTMINSTER, S.W.,

PATENTEE and MANUFACTURER of the following Invention

RETORT SETTINGS—giving great Economy of Fuel.
STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHERS, SCRUBBERS.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Eighteen Illustrations and Letterpress on the Construction of Gas-Works, post free, 2s. 6d.

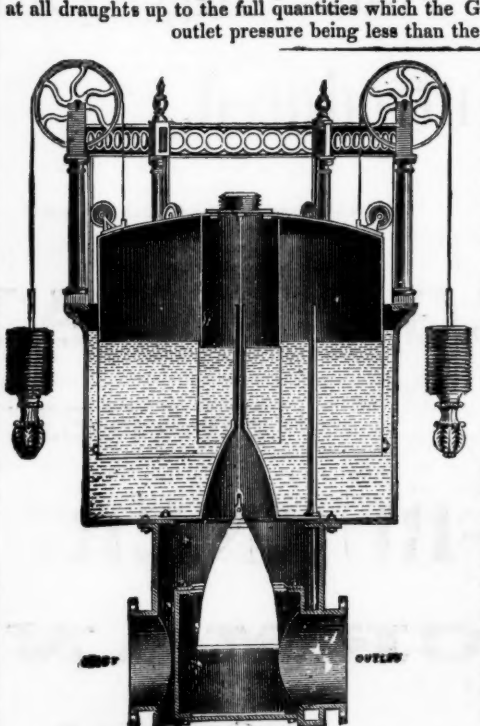
PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,
35a, GREAT GEORGE STREET, WESTMINSTER, S.W.

J. & J. BRADDOCK,
GLOBE METER-WORKS,
OLDHAM,

Beg to submit to Gas Engineers their

PATENT COMPENSATING GAS GOVERNOR,

Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



VERTICAL SECTION

The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 24-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.

THE SILKSTONE & DODWORTH COAL & IRON COMPANY, LIMITED,

DODWORTH, BARNSLEY.

BENJAMIN WHITWORTH, Esq., M.P. . . . . Chairman.
Mr. RICHARD HARTLEY . . . . . Managing Director.

REAL OLD SILKSTONE GAS COAL.

JAMES PATERSON Esq., Gas Engineer, of the Warrington Gas Company, reported, Aug. 10, 1875:—

"This Coal possesses remarkable qualities as a gas and coking coal, and appears SECOND TO NONE IN THE KINGDOM. It contains the large quantity of 699 lbs. of illuminating matter, and 1498 lbs. of coke to the ton, and produces **12,240** cubic feet of 16·66 candle gas."

The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.

PARIS EXHIBITION, 1878.

THREE MEDALS
AND
HONOURABLE MENTION
HAVE BEEN AWARDED TO
JOSEPH CLIFF & SONS
For their Various Exhibits, amongst which is a
SILVER MEDAL
FOR THEIR
PATENT MACHINE-MADE
RETORTS AND FIRE-BRICKS,
Being the Highest Honour given for this class.

Fstablished

1795.

JOSEPH CLIFF & SONS,

THE ORIGINAL
WORTLEY FIRE-BRICK WORKS,
NEAR LEEDS,
London Wharf: No. 4, inside Great Northern Goods Station, King's Cross, N. Liverpool: Leeds Street.

SPECIAL NOTICE.—Our Patent Machine-Made Retorts have now been thoroughly tested, and have proved themselves infinitely superior to those made by hand. At several large works it has been settled, beyond question, that, owing to the compactness and general excellence, more gas is sent to the gasholder from each ton of coal carbonized than is the case with hand-made Retorts.

SAMUEL CUTLER & SONS,

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